PULP and PAPER MAGAZINE OF CANADA

A Monthly Magazine devoted to the interests of Pulp and Paper Manufacturers and Merchants.

INDEX TO VOL. II.

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PULP AND PAPER MAGAZINE

MONTREAL AND TORONTO

Vol. 2. CONTENTS—JANUARY, 1904. No. 1.

INDEX TO ADVERTISEMENTS.

—Hugh C. Maclean, of the Hugh C. Maclean Publishing Co., Ltd., Toronto, has acquired The Commercial, Winnipeg, Man. The paper will be enlarged, but its publication will go on without any break.

—According to official returns the United States imports from Canada in paper stock, and rags other than woolen rags, for the eleven months ending November last, were $106,145, against $95,827 in the same period of 1902, and $96,831 in 1901. The United States imports from this country of wood pulp in the same periods were as follows: 1903, 77,006 tons, value $1,080,684; 1902, 62,551 tons, value $1,516,515; 1901, 36,055 tons, value $1,016,868. In the eleven months of last year the exports of United States paper to Canada were $1,445,799, against $1,312,328 in the same period of 1902.

THE
PULP AND PAPER MAGAZINE
OF CANADA

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Pulp and Paper Magazine

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BIGGAR-SAMUEL, LIMITED,
PUBLISHERS
18 Court St., TORONTO. Fraser Bldg., MONTREAL.

—The first volume of this magazine closed with the December issue, and a new volume begins with this number in order to make future volumes close with the calendar year. Subscribers who wish to bind their paper and require an index will please send in their names and addresses and the index will be mailed as soon as ready.

A QUESTION ANSWERED.

Elsewhere in this issue some figures are given from the World's Paper Trade Review on the recent course of British exports to Canada in paper and paper products. Our contemporary is in doubt as to why British papers, with the aid of the preferential tariff, have not made headway compared with those of the United States; but this is no insoluble riddle to Canadians. The Review suggests the burning of the Eddy Company's mills at Hull, Que., as a possible explanation. What happened after that fire may, indeed, explain the relative decadence of British trade with Canada, not only in the paper trade, but in many other lines; but the cause is not to be traced to the fire itself. The Eddy mills, though not the largest in Canada, are the largest in a certain class of papers, and when the fire occurred, some travellers representing United States mills in that class of papers were, in the words of the old song, "on their way to Canaday," and were drumming up the Canadian customers of the Eddy mills the next day. Where were the agents of British houses in this line when this opportunity presented itself? They were not "i' the imminent deadly breach," and consequently United States and not British mills got a footing in the trade here. Lack of alertness and adaptability. This may be applied to other occasions and other branches of the trade, and may be set down as the general answer.

Of course, there are qualifications. The United States mills, in some instances, have the advantage in nearness

to the chief paper consuming centres of Canada, and consequently can deliver goods not only in quicker time, but at lower freight rates. Yet in most cases this could be largely offset by the use of the cable and by making terms with customers for the purchase of larger lots, and by having stocks on hand from which the purchaser could draw according to Canadian custom. When the preferential tariff is taken into the account the advantage of freight should be altogether in favor of the British mill if its equipment were up to date and its output on the scale of United States mills. This is not saying that many of the British mills are not as well equipped and on as large a scale as the best of the United States mills, but, according to the Mosely Commission, the United States mills have a better average in quantity of output. One can only suppose that the same causes explain why United States paper makers have in recent years been making relatively greater headway in other markets—New Zealand and Australia, for instance, where freights are equalized by distance, but where the channels of communication are established in favor of the British maker.

There appears to be no reason why, on the whole, the trade of Great Britain with Canada in paper and goods made of paper should not have immensely increased since the adoption of the preferential tariff. It is quite obvious that the development of our home manufactures in this line cannot account for the comparative decline in British trade, since the United States and other countries have steadily increased their exports to this country in spite of the higher duties paid in the past three years. It is apparent that the business Great Britain has lost and is still losing in Canada in the paper trade, and not in the pape trade only, is being lost through condi tions which are quite in the power o British manufacturers to alter.

United States periodical and othe literature is pouring into Canada in a constantly increasing tide; British litera ture is barred out of Canada by posta laws and postal rates of British making that are practically prohibitive of a like increase. As trade follows the press more than the flag, can we wonder at the results? A Government that extracts a surplus of £4,000,000 sterling, through the post office, out of the products of the press, and indirectly out of the paper trade, and applies the greater part of this tax on literature to the maintenance of the navy, as it does, cannot wonder at United States paper and newspapers coming in increasing quantities into Britain itself as well as Britain's colonies.

We are far from regarding such a flooding as a calamity. It should make for friendly intercourse and social intimacy between the two peoples, and is in all ways to be desired so long as the bulk of such literature is not the moral poison which too much of it which finds its way to Canada is. But the tide should not forever set in one direction. There should be a fair and free ebb and flow in order to keep the ocean at its natural level and normal temperature.

NEW ZEALAND TARIFF AND THE PAPER TRADE.

Another new market is opened up as it has never been opened before to Canadian merchants and manufacturers, namely, New Zealand, a colony which, like its great neighbor, the Common-

wealth of Australia, has a splendid future. The secretary of the Canadian Manufacturers' Association has prepared a list of items that would be favorably affected in the case of Canada, showing the rate of duty under the New Zealand general tariff, and the lower preferential rate under which Canadian goods would go into that colony. As will be seen, the items thus favorably affected include paper of all kinds, and since our United States neighbors already do an increasing trade in that quarter of the world, this new opening for Canadians under the preferential tariff should not be neglected. So quick are the United States manufacturers at seeing the advantages Canada will enjoy under this new tariff that a number of exporters of New York and other cities in the Republic have opened up correspondence with Canadian houses making lines of goods similar to those hitherto exported to New Zealand from the United States. The alert New Yorkers are willing to handle Canadian goods if those of their own country are knocked out of the market. The following is the list referred to.

New Zealand Preferential Tariff.

First Schedule.

	Pref. Tariff. Brl.	Gen. Tariff. Brl.
Cement	2s.	4s.

Second Schedule.

	P.C.	P.C.
Basket and wickerware	20	30
Cycles and like vehicles	20	30
Boots, shoes and slippers	22½	33¾
Candles, per lb.	1d.	1½d.
Carriages, wagons, etc.	20	30
China, porcelain and parianware	20	30
Clocks	20	30
Cordage and ropes, n.o.e.	20	30
Cream of tartar, per lb.	1d.	1½d.
Earthenware & stoneware	20	30
Fancy goods and toys	20	30
Firearms—all kinds	15	22½
Fish, potted, per lb.	2d.	3d.
Furniture and cabinetware	25	37½
Glass, per 100 ft. superficial	2s.	3s.
Glassware—plate glass and colored	20	30
Hardware, ironmongery hollowware	20	30
Hops, per lb.	6d.	9d.
Iron nails, per cwt.	2s.	3s.
Iron pipes and fittings	5	7½
Lamps, lanterns and wick	15	22½
Pianos	20	30
Paperhangings	15	22½
Paper, wrapping, other kinds, including brown, cartridge and sugar papers, per cwt.	5s.	7s. 6d.
Plate and plated ware	20	30
Pumping machinery	20	30

Third Schedule.

Cycle fittings and supplies Gas and oil engines Gumboots Iron and steel cordage Sheet, rod, bar and plate iron Printing paper Railway rails Sailcloth, canvas, etc. Surgical and dental instruments	Free, 20 p.c.

The Paper Trade Journal, of New York, writing on the situation created by the new tariff, says:

"The information that New Zealand had adopted a tariff which favors Great Britain and is against the United States, and especially against the products of United States paper mills, is confirmed by later advices from that country. Printing paper going into New Zealand must pay 20 per cent. ad valorem and wrapping and other paper 50 per cent. ad valorem unless they are the product of British mills. Exporters agree that this will damage, if not effectually end, our paper trade in the growing market of New Zealand, and it would seem as

though here is a red-hot live topic on which the American Paper and Pulp Association can do some first class missionary work. The action of New Zealand certainly should lead to an increase in the duty of British made paper entering this country, just as surely as the action of the Province of Quebec in allowing a rebate in the price of wood manufactured within her borders led to a countervailing duty on the pulp that she afterward sent to United States mills."

If the method of holding trade here suggested is inspired by any responsible proportion of United States paper manufacturers or exporters, then one can only observe that they have much to learn concerning British colonies such as New Zealand and Canada. In fiscal matters the legislative independence of all British colonies except the Crown colonies is as complete as that of the United States itself, and the attempt to coerce any of these colonies by raising duties on British goods would be about as effective as to think that if Holland raised her tariff she could be punished by retaliation on her next of kin, Germany. The mention of Germany will call to mind a proof of the position. When Canada adopted her preferential tariff, that country sought to prevent it by dealing with the British Government, and when this failed, Germany tried to punish Canada by a discriminating tariff on Canadian imports. Canada's answer to this was a surtax against German goods, which has already reduced the aggregate of German exports by 25 per cent., and has literally wiped out German shipments to Canada in some lines, such as cement. Having had enough of this, the German Government became anxious to come to terms, and applied to the British Secretary of State for the Colonies, who referred them to Ottawa. The origin of this contest and the final reference of the matter to Ottawa will show that Canada is running a store of its own, and so is New Zealand.

But even if this were not so, would the raising of the tariff against British papers be effective as a stroke of retaliation? Already as a matter of protection to its own mills the United States has raised the duties against British goods till the British Paper Makers' Association as a body declined to be represented at the St. Louis Fair, giving as the reason that there was not business enough in medium and lower grade goods to warrant the effort of making a British exhibit there. The British exports of paper to the States continue to decline, and are only maintained in specialties which are not made to advantage in the United States. Even if New Zealand and Great Britain were a legislative unit, the position would still be this, that the United States has a growing trade in New Zealand to lose, while she has already destroyed about all of the British paper trade that was worth having—in the one case the tariff sword is in the adversary's hand, while in the other it has already done its worst and has no more power. The preferential tariff principle in a commercially confederated British Empire raises a new situation, and if the United States wants to trade with the Empire it will have to abandon its old policy of grab-all-and-give-nothing. This policy was condemned long ago in the words, "There is that witholdeth more than is meet, but it tendeth to poverty"—poverty of character, if not poverty of means.

As to the reference to the Province of Quebec, the parallel is not obvious. The

Government of Quebec is willing to see the Province stripped of its chief asset, the spruce forests, as fast as possible, for the sake of raising money to cover up the annual deficits of a spendthrift administration. The countervailing duty can only be said to be an aid to that end, inasmuch as United States operators are put on a perfect equality with the home consumer. On the other hand, the Government and people of Ontario desire to conserve its forest assets and keep its lumbering and other wood manufacturing business at home, and so prohibit the export of wood from Crown lands to the United States. And yet we find no "countervailing duty," much less prohibition, against Ontario pulp! Why? Because United States mills want Canadian pulp, and in some districts are absolutely dependent on it. Because one reckless Provincial Government chooses, like a spendthrift heir, to squander the greatest of its natural resources without regard to the after consequences, many good people in the United States appear to be running off with the idea that this recklessness—which is becoming for more reasons than one a scandal in our provincial history — means that Canada's hopes for the future depend upon her ability to sell pulp wood to the United States. If the United States market were closed, the worst that could happen, even to the handful of people whose livelihood depends on getting out pulp wood from the woods of Quebec, would be that their work would be at a standstill until pulp and paper mills could be erected in the Province. The timber would still be there, and is not going to decrease in value by the lapse of a few years.

To return to the New Zealand tariff, we would urge Canadian paper manufacturers to get in touch with the sister colony, and lose no time in picking up the business which United States mills will drop. To our United States friends we would say, that the best way to meet the new situation is to join the British Empire combination, from which the Republic should never have segregated itself, and come in on the broad basis of reciprocity. We do not expect our neighbors to give up their flag, for Canada does not intend to give up its own legislative independence in the federation of the Empire—but in commercial matters Canada has always been open to negotiate for a freer and fairer deal.

SCANDINAVIAN VS. CANADA.

"Shadower," a regular contributor to the Paper Maker, London, writes:

I notice, in one of the Scandinavian papers referred to, it is stated that the Swedish and Norwegian pulp makers do not fear competition from Canada. In fact, "Farmand" is convinced that Canada, as a pulp making country, need not be taken into serious consideration. To back up its assertions, "Farmand" quotes me from various issues of the "Paper Maker," in which I have mentioned several Canadian pulp mills having got into difficulties. It reproduces my statements respecting the trouble at the "Soo," the Acadia Company's mills, and Sissiboo; but this is hardly fair, as the reasons for their stoppage are now well known, and cannot be taken as evidence of Canada's unfitness to become a big pulp-producing country. Ask "Uncle Sam's" papermakers, and they will tell you that Canada is the big source of their wood pulp supply of the future. Look at Chicoutimi. Where is there a more successful and better equipped mechanical wood pulp plant in the world? "Farmand" might just as well include the instance which has just been brought before me

respecting the Belgo-Canadian Company's plant at Shawinigan. The mill is all right, and so is the plant; but what is crippling the concern? Why, overcapitalization, and being under the thumb of the Shawinigan Water and Power Company. Scandinavian pulp makers must not, like the ostrich bury their heads in the sand in the belief that they are perfectly safe so long as they refuse to see what is happening around them. They can take it from me as one who has studied the subject so thoroughly on many visits to Canada, that the Great Dominion is destined to be a very important competitor of the future in the wood pulp markets of Europe. I should like to impress on "Farmand" that Scandinavian pulp makers have nothing to fear from Canadian competition on prices, as the Canadian makers of mechanical pulp have always been well sold, and their product will, in the future, as in the past, generally speaking, always command more money.

STRIKE OF EDDY S PAPER-MAKERS.

There is a strike at the paper mills of the E. B. Eddy Co., Hull, Que., the employees refusing to conform to the recent order that they work until twelve o'clock Saturday nights instead of 5.30, as has been the custom during 1903. The question of hours of labor has given trouble at intervals since 1900, and on the 2nd inst. the company issued a mandate that from the 9th inst. the hours would be extended.

The employees, who belong to the International Brotherhood of Paper-makers, sent a notice that they could not accept the order, but that if the output of the mill was not sufficient they were willing to work according to the three shifts hour system, that is with three shifts per day, each working eight hours. It was further claimed that the short hour schedule is in force at the mills of the Canada Paper Company, Windsor Mills, Que.; the Laurentide Pulp Company, Grand Mere, Que., and the Toronto Paper Company, Cornwall, Ont. I reply, the company issued an order tha all who were not willing to obey th order might consider themselves dis charged. Consequently at 5.30 o'cloc on the 9th the whole paper mill staff lef in a body, and the mill will be idle unti the company can either fill up with out side men or come to some arrangemen with its former employees. Betwee three and four hundred men are affecte by the lock-out. There are 125 unio papermakers and 250 helpers. The paper-makers are in four classes, according t ability, being paid $1.35, $1.50, $2.50 and $3.25 a day, respectively.

The fight promises to be a bitter one, and may affect many of the daily papers in Canada who depend upon the Eddy Company for news-print. The company purpose to keep "open shop," and will start the mill as soon as men are available. The men, on the other hand, prophesy trouble if non-union labor is employed. They do not think it possible to get enough men to operate the mill, claiming they can stand a siege. The union allows the married men $5 a week and single men $3, and they have promises of plenty of food. The girls of the counting and finishing-room and in the rag-room have quit work out of sympathy.

The company issued a notice that applications from its late employees for re-engagement would be considered up to January 16th, after which date proceedings would be taken to fill all vacancies. This resulted in some of the older men returning to work, and the company had two machines running on January 18th. Mr. Eddy states that they are still willing to take back those of their old hands whom they choose if they make application rather than see them leave the city, but they are as determined as ever to keep "open shop." The paper makers say there are no new developments from their point of view. Daily discussions are being held, and they are preparing for a long fight. The pulp and sulphite workers are forming a lodge, and a meeting on January 17th

was attended by about 41 members as well as by the locked-out paper makers and many sympathisers, in all about 400. Mr. Scully, president of the Hull lodge of Papermakers, presided, and speeches were made by C. S. O. Boudreault, Embey, N. Mercer, E. Walsh, Scully and Smith. After the public meeting twenty-five candidates were initiated. The Free Press reports that five or six men have been sworn in as special constables in Hull to be ready in case of any trouble arising. The sulphite and pulp mills will not shut down, as if the company accumulates a larger supply than it needs for its own consumption it will sell the surplus.

BRITISH MARKETS.

The World's Paper Trade Review reports on the London markets under date of January 8th:

Chemicals—The chemical market is rather quiet. For bleaching powder consumers seem to have mostly placed their contracts at more favorable prices than those now ruling, viz., £4 to £4 5s. Alkali, 58 per cent., stands at £4 10s. Caustic soda is firm, 77 per cent. being quoted £10 10s. to £10 15s. Soda crystals stand at £3 2s. 6d. to £3 5s., and salt cake at 26s. to 27s. in bulk. Recovered sulphur is quoted £5 5s. to £5 7s. 6d. Alum, sulphate of alumina, and blanc fixie are steady at unchanged prices.

Chemical Wood Pulps—A fair enquiry is reported, and manufacturers are firm in their quotations.

Mechanical Wood Pulps — Scandinavian producers have not succeeded in forming a central sales office. A good demand, however, is said to be current and prices are in an upward direction. In the United States and Canada a scarcity is reported, and any transactions show a substantial advance in prices.

—Charles H. Lugrin, formerly Provincial Secretary of the New Brunswick Legislature, will shortly publish in Vancouver, B.C., a weekly periodical, to be called "Progress," devoted to the general advancement of British Columbia interests.

—A pamphlet published in England dealing with the course of the British paper trade shows that while from 1882 to 1902 the imports of foreign-made paper to Great Britain increased by 256 per cent. in value; the increase in weight of the same was 430 per cent. From this it would appear that in the cheaper grades of paper the British maker was relatively losing ground.

—Reporting on the wood pulp market in France, A. L. Grondal, of Paris, states: An active demand has been experienced for chemical wood pulps, and prices show an advance. Makers report that the greater part of this year's make has already been sold, while some mills announce that their entire production has been disposed of. In mechanical, prices are well maintained, but there is an absence of business owing to the divergent views of buyers and sellers.

—It appears that the so-called asbestos fire-proof curtain used at the Iroquois theatre in Chicago was not pure asbestos, but a mixture of paper pulp and asbestos fibre. It is believed that had the curtain been of pure asbestos and the drop mechanism in proper working order the great calamity would not have occurred. It was a case of cheap imitation of a genuine article. Asbestos is fire-proof, but its fibres are weak, and have to be strengthened and held together by fine wire netting. By mixing paper pulp with the asbestos the wire backing can be dispensed with, but the result is that the curtain is no longer fire-proof, but highly inflammable. History is full of records of such disasters that have been brought about by bad workmanship. Ships have been sunk, battles lost, and buildings and machinery wrecked through poor materials, bad handicraft; but as an object lesson on the extent of disaster that is possible to follow from such a trifling fraud the Iroquois theatre should remain eminent for all time.

PULP SHIPMENTS TO GREAT BRITAIN.

The following were the shipments of wet mechanical pulp to British ports from Canada in November and December:

Date.	From	At	Importers.	Tons.	Value.
Nov. 2.—	Halifax	London	Becker & Co	72	£ 182
" 6.—	Chicoutimi	Cardiff	Owen & Co., Ltd	1,973	3,946
" 6.—	Quebec	Grimsby	Dixon & Son	1,214	2,428
" 6.—	Three Rivers	Grimsby	Dixon & Son	573	1,146
" 3.—	Quebec	Manchester	H. B. Wood	20	38
" 12.—	Halifax	Liverpool	Becker & Co	105	240
" 11.—	Quebec	Manchester	H. B. Wood	746	1,490
" 24.—	Halifax	Liverpool	Becker & Co	208	478
" 25.—	Quebec	Manchester	H. B. Wood	820	1,640
Dec. 3.—	Quebec	Manchester	Becker & Co	419	965
" 5.—	Chicoutimi	Queensboro'	Becker & Co	3,648	8,210
" 11.—	Halifax	Liverpool	Becker & Co	252	580
" 7.—	Quebec	Manchester	H. B. Wood	2	4
" 8.—	Quebec	Manchester	H. B. Wood	255	510
" 10.—	Quebec	Manchester	Becker & Co	8	16
" 11.—	Quebec	Manchester	Becker & Co	1,320	3,037
" 11.—	Quebec	Manchester	S. W. Royse & Co	96	192
" 14.—	Chicoutimi	Cardiff	T. Owen & Co., Ltd	2,800	5,600
" 14.—	Quebec	Manchester	S. W. Royse & Co	50	99

A new stack of calenders has been installed in the news department of Wm. Barber & Bros.' paper mills, at Georgetown, Ont.

—The Eastwood Wire Manufacturing Co., of Belleville, N.J., manufacturers of fourdrinier wires, dandy rolls, screen plates, suction box covers, etc., have issued a very serviceable calendar for 1904. It will be sent while it lasts to Canadians engaged in the pulp and paper trades.

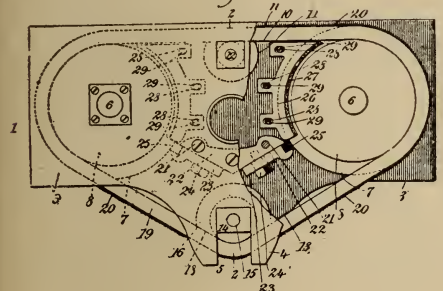
—T. J. McDonald, Pembroke, who went to Australia from that locality three years ago, is visiting Canada as purchasing agent for the firm of S. S. Chipman, of Sydney, one of the largest Australian importing houses. He has been making a tour of the United States and Canada for his firm, and after visiting his old home he will go to Sturgeon Falls, where he proposes, if possible, to place a contract for the output of the paper mill at that place.—Almonte Gazette.

A writer in the Paper Maker has this to say of the proposed Scandinavian syndicate agency in London: "I warn them seriously of another danger they will run, and that is from Canada, for every move they make for cornering pulp and unduly raising prices will be welcomed by the Canadian pulp makers, who will not be slow to avail themselves of such a fine opportunity to come to the British papermakers' assistance by pushing their pulp for all it is worth. Scandinavian pulpmakers must not forget that Canadian pulp is well established in England and a fast favorite. The imports of Canadian wood pulp are steadily rising every year. If the Scandinavian pulpmakers are going to be satisfied with a fair and reasonable profit, then they have not much to fear; but so soon as they put on the screw they will spoil themselves."

A NEW SUCTION DEVICE FOR PULP.

Among the patents recently issued in the United States and Canada is one to Joseph Lewis Youngs, of Chateaugay, N.Y., for a new form of suction device for use in the manufacture of pulp. In his specifications the inventor says: "In the manufacture of paper and other pulp it is sometimes the practice to subject the pulp to air suction by which to eliminate or remove therefrom as much as possible of the moisture contained therein previous to delivery of the pulp

Fig 1



to the driers or presses therefor, and in the use of many forms of suction devices hitherto devised for this purpose disadvantages have been encountered, due principally to the frequent stoppages of the machine, caused by undue friction produced by the suction device.

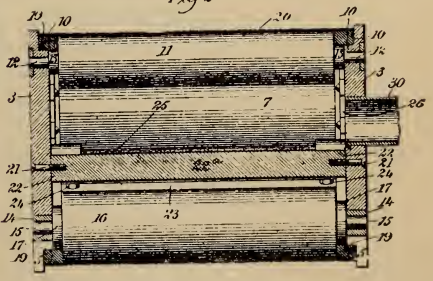
"The present invention has for its principal object to overcome many former objections to suction devices for this purpose, and to provide a device of the kind which is simple both in the construction and organization, reliable, comparatively inexpensive, possessing the capacity for long service, and composed of few parts easily assembled, repaired and replaced, besides not being liable to get out of order."

Fig. 1 is an end elevation, partly broken out, of a suction device for pulp machines embodying the improvements; and Fig. 2 is a vertical transverse sectional view thereof, taken on the line 2 2 of Fig. 1.

The inventor employs a casing of special construction, in which is supported a plurality of specially organized rolls, over which is carried an endless belt or band of wire cloth of suitable mesh, and a specially constructed suction chamber within the casing, with means whereby the different joints and crevices between the parts are rendered securely air tight.

In the drawings, 1 represents the improved suction device in its entirety, the same comprising two end pieces or sections 3 3, each oblong in form, and having a central hanging portion 4, each of the hanging portions being formed with a comparatively deep notch 5, leading upwardly from the edge thereof. Having their bearings in the end pieces or sections are the ends or journals 6 6 of duplicate rotatable rolls 7 7, each of which latter is reduced in diameter all around at each end to form an intermediate short section 8, a portion of the constantly moving surface of which is always flush with the upper surface of a longitudinal ledge 10, formed or provided on the inner surface of the adjacent end section 3 of the device, as shown, and located intermediate the rolls 7 7, at the upper part of the suction device, is a rotatable roll 11, which is considerably smaller in diameter than either of the first mentioned rolls, the journals 12 of this roll 11 being likewise supported in

Fig 2



suitable bearings therefor in the said end pieces of sections 3 3.

This roll 11 is so mounted that a portion of its constantly moving surface will be intersected or touched by an imaginary horizontal line uniting the uppermost portions of the rolls 7 7, and each end of roll 11 is likewise reduced in diameter to form a short section 13 inter-

mediate the main diameter of the roll and the corresponding journal a portion of the moving surfaces of sections 13 also always being flush with the aforesaid ledges 10 on the inner sides of the end sections 3 3. (See Fig. 2.) Mounted in bearings 14 therefor, which are slidable vertically between the sides of the notches 5 in the hanging portions 4 of the end sections 3 3, are the journals 15 of a tension-roller 16, the roller also being formed at each end with an intermediate short section 17 of reduced diameter, and the hanging portions being provided on their inner surfaces with ledges or projections 18, located at either side of each of the notches 5 in the end sections 3.

Passing around the reduced intermediate section at either end of each of the rolls referred to is a suitable band 19 (preferably elastic), which of a thickness equal to the difference between the diameters of each roll and its sections, each band being also of a width equaling that of the space between the ends of each roll, and the adjacent surfaces of the side pieces or sections 3 3, and fitted to the outer surfaces of the bands are the edge portions of an endless apron 20, of foraminated material, as wire-gauze, as shown, it being understood that the roll 16, by its weight, serves to maintain the bands and said apron taut upon the rolls.

Secured to the inner surfaces of the side pieces or sections 3 3 by means of screws 21 are corresponding brackets 22, the under surface of each of which is formed with angular or reversely inclined faces, as shown, and the brackets being connected by a longitudinal member 22a. Also connecting the brackets are adjustable bars 23 (see Fig. 1), secured at each end by means of screws 24 passing through the same and entering the angular faces of the brackets, the outer edge of each of the bars being provided with a strip 25, having contact with the periphery of the adjacent roll 7. (See Fig. 1.) Also fitted to the inner surface of each end piece or section 3 3 is an adjustable shoe 26, which is curved at 27 in conformity with the periphery of the adjacent reduced section 8 of the roll 7, the shoes each being formed with slotted lugs 28, through which pass the screws 29 for supporting the shoes in place.

There is provided an interior suction-chamber entering which from one end of the device is a pipe 30, which may lead to a pump or other similar device. By mounting the suction device in proper position, so that the upper surface of the wire-gauze apron will come beneath the travelling felt (not shown), by which the wet pulp is carried, the superfluous wet or moisture may be rapidly withdrawn from such pulp on producing a suction in the chamber through the pipe. By the use of the device, it is claimed that the felt and pulp will not be drawn into the suction-chamber, no matter how powerful the suction, and that the operation may be carried on uniformly and successfully.

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[For the Pulp and Paper Magazine.]

TESTING BALES OF WOOD PULP.

CALCULATION OF AVERAGE RESULTS.

R. W. Sindall, Chemical Engineer, London, Eng.

In many cases the delivery of raw material to the paper mill involves a repetition of tests upon the same consignment for several reasons, such as irregularity in gross weight or variation in composition, according to the nature of the substance under consideration. If, for example, the material is caustic soda, which exhibits considerable difference between the various drums as to the percentage of available soda, then a true idea of the average amount is only to be gauged by repeated tests. In the case of wood pulp, the gross weight of individual bales may vary to a large extent, causing much trouble when testing and sampling is being done. The variation in moisture is also another cause of difficulty in arriving at the actual amount of air-dry pulp present in any particular consignment.

These differences compel the repetition of tests, and we propose to suggest one or two interesting points with regard to

the calculation of the average test from any given number which has been made. We may take as an illustration the question of the percentage of air-dry fibre in wood pulp, although the same reasoning will apply to any raw material and its analysis, such as the percentage of soda in caustic, the amount of available chlorine in bleaching powder, the quantity of moisture in china clay, the percentage of residual ash in the finished paper, and numerous other subjects connected with the paper-making industry.

The simplest case which may be quoted is as follows: A consignment of wood pulp is delivered according to invoice as 1,000 bales at 200 lbs. each moist, weighing 100 tons wet, 50 per cent. air-dry pulp. For a test ten carefully selected bales are weighed and sampled, showing a net weight equal to 1,980 lbs., and testing 50 per cent. air-dry pulp. A second test is made, in which 30 bales are again carefully submitted to a similar test, weighing 5,940 lbs., giving 51.2 per cent. air-dry pulp. Here the gross weights per bale are identical:

In the first test 10 bales = 1,980 lbs.
In the second test 10 bales = 1,980 lbs.

and hence the question of the actual average is confined to the percentage of air-dry pulp.

The usual plan adopted in a case of this sort is to take the mean of the two results, thus: $(50 + 51.2) \div 2 = 50.6$ as the correct percentage. Is this plan of calculating mathematically correct? In the one test only ten bales are chosen, while thirty bales are selected for the second. It is obvious that the test in the latter instance must possess a value which is more to be depended on than the former in proportion to the larger number of bales tested.

It is only reasonable and logical to suppose that thirty bales, weighed and tested in toto, would give the same result as if these thirty had been sampled in three lots of ten each. Hence, it follows that the two tests actually made are equivalent to the combined effects of one made on ten bales and three made on lots of ten bales each.

From this it is clear that the only mathematical way of determining the true average is to reduce the figures to a condition of equality as far as the tests themselves are concerned. In other words, the average does not lie between the mean of 50 and 51.2, but between 50 per cent. as the result of a test on ten bales and three times 51.2 as the result of the second test, thus:

$$(50+51.2+51.2+51.2)\div 4=50.9\%$$

The effect of such a method of calculation is, in this instance, a raising of the percentage of an air-dry fibre to the extent of 0.3 per cent., which is a considerable quantity.

The accuracy of this reasoning may be placed beyond question by supposing that four tests have been made, each on ten bales, the gross weight of which we may, for the sake of simplifying the argument, assume to be the same in each of the four tests. The tests respectively showed:

50.00%, 51.80%, 51.60%, 50.20%

the mean of which gives 50.9% as the true average. The mean of the last three tests $(51.6 + 51.8 + 50.2) = 51.2$, which is the result arrived at in the original example quoted.

The importance of thus reducing each test to what may be termed "an equivalent condition" cannot be exaggerated, because far greater variations constantly occur than those given above, and the effect on the bulk received is considerable. Thus, in the case quoted we may get two different amounts of air-dry pulp, according to the method adopted in determining the average percentage, which we may proceed to illustrate:

The gross weight of ten bales is 1,980 lbs., from which the weight of the bulk, 1,000 bales, is 198,000 lbs. The air-dry weight of this pulp by the usual plan of taking average results, without any regard to conditions, would be 100,188 lbs.

If the more correct method of obtaining the average result be adopted as shown, then the air-dry weight is 50.9 per cent. of 198,000 lbs. = 100,782 lbs. This difference of 406 lbs. is only a small one in the example given, and a differ-

ence which cannot be regarded as of much practical value, but at the same time it serves its purpose in indicating the need of paying some attention to the calculations involved in final results, which in many cases of actual practice would considerably alter the figures obtained by methods which may be looked upon as mathematically incorrect.

This point may be emphasized still further by another instance of the application of the method to the weighing of samples, such as bales of wood pulp, etc. We may assume a case in which sixty bales are very carefully weighed, showing a gross amount of 12,070 lbs. These bales are again weighed in separate lots as follows:

		Lbs.
First lot.....	10 bales	= 2,010
Second lot.....	20 bales	= 4,000
Third lot.....	30 bales	= 6,060
	60	12,070

		Lbs.
First lot	10 bales	= 2,010
Second lot.....	per bale	= 200
Third lot.....	per bale	= 202
Lot, per bale.....		201

But the weight of one bale is not 201 lbs., as would appear from averages taken in this way. It is 12,070 ÷ 60 = 201.166 lbs., but if calculated from the three results independently, the mean of these gives 201 lbs.

It can be shown that this difference is due to the fact of ignoring the relative value of the three separate tests. It is clear that the test containing the thirty bales has most influence upon the final result, and hence, before any average is calculated, the test should be reduced to an "equivalent condition." Hence, we may proceed as follows: The true average, if calculated from the three separate tests, if found from these figures, ten bales will weigh respectively:

Lot 1.	Lot 2.	Lot 3.
201	200	202
	200	202
		202

Hence, 60 bales = 12,070 lbs., or one bale = 201.166 lbs., obtained by taking the test for the smallest number of bales, viz., ten, and repeating the test for the others in proportion to the number of bales in each; i.e., in second test two lots of ten each, and in third test three lots of ten each. This gives the same weight as that calculated on the gross weight of the whole sixty, and hence supports the argument in favor of reducing the figures obtained from repeated tests to a condition in which they may be fairly and justly compared.

INTERNATIONAL FORESTRY CONVENTION.

At the annual meeting of the American Forestry Association, held in Washington recently, Gifford Pinchot, chief forester for the United States; E. Stewart, Superintendent of Forestry of Canada, and Dr. Tarleton H. Bean, director of the forestry exhibit of the Exposition, were appointed a committee to make arrangements for an international forestry convention to be held at St. Louis during the World's Fair. No date was set, but it will probably be early in the fall of 1904. Invitations will be sent to forestry representatives in all countries. The Canadian Forestry Association will send a good representation. While at Washington Mr. Stewart arranged for some of the leading foresters of the United States to attend the annual meeting of the Canadian Forestry Association at Toronto on March 10th and 11th.

FORESTRY IN NOVA SCOTIA.

The Nova Scotia Lumbermen's Association met at Truro, N.S., for the transaction of general routine business and the election of officers for 1904. This year's officers are: President, Alfred Dickie; vice-president, J. H. Levingston; treasurer, W. J. Kent; secretary, D. G. McDonald. The association decided to join hands with the Western Nova Scotia Timber Owners' Association in

their efforts to obtain better fire protection of timber lands, and a bill is to be drafted for presentation at the next session of the Legislative Assembly. It is proposed to form a Provincial association, which, under authority from the Government, would exercise jurisdiction over timber lands, also to have a chief forest warden, with a staff of trained sub-wardens to direct operations in case of fires.

NEWSPAPER POSTAL RATES FROM ENGLAND.

The World's Paper Trade Review comments upon the necessity of cheaper newspaper rates from England as follows: "A corollary to the need for a fast British mail service is the paramount necessity of something being done immediately to reduce the cost of postage of newspapers and magazines between the Mother Country and Canada. At present, owing to the remarkable cheapness of the United States postal rates, Canada is flooded with American publications. British newspapers and magazines are comparatvely rarely seen, and the news of the outer world contained in the local journals is almost entirely obtained through American sources. Thus, young Canada is being largely nurtured on the doctrine that all that is great, progressive, and glorious is of American origin, while Great Britain is an effete country, rapidly losing both her commercial and political supremacy. Yet the British Government is content to allow such a state of affairs to go steadily on, and solaces itself with gloating over the growing revenue of its postal budget! The possibility of the gradual Americanization of a great British State is a matter of serious import, and demands early and effective action, without haggling over the cost. At all events, we are convinced that the matter only requires to be brought home to the people of this country to secure the amelioration of conditions that are so antagonistic to common sense and to the interests of the British Empire."

THREAD FROM PAPER PULP.

Kuhlow's German Trade Review gives the following particulars of a Chemnitz invention dealing with the preparation and spinning of threads from cellulose, paper, paper pulp, and similar materials. The cellulose is made into a web or sheet of paper of the full width of the paper machine and wound into a roll. The web is then drawn from the roll through a specially designed apparatus in which it is cut into strips by rotary disc cutters, separated by smaller discs of soft or yielding material, and alternate strips are passed in opposite directions and guided so as to separate them more effectively. The strips are then moistened by means of a moistening apparatus, condensed into round threads by rubbers, and coiled in receptacles analogous to silver cans. Each receptacle contains a central projection or core, and may have hot air or steam injected into it for the purpose of maintaining the material as required in a dry or moist condition. The material is drawn from the receptacles and spun upon ring-spinning or other machines.

CELLULOSE AND SULPHITE WOOD PULP.

At the fifth International Congress of Applied Chemistry, in Berlin, Germany, Prof. Klason read a paper on "The Determination of Cellulose in Wood and Valuation of Sulphite Wood Pulp," in which, under the name of cellulose, the author denotes those carbohydrates which are not dissolved by heating for the twenty-four hours at the boiling point of toluene, 108° C., with solutions of calcium or magnesium bisulphite of a certain composition. The composition of such solutions should correspond with the formulæ $N/2\ CaO(SO_2)_2 + N/6\ SO_2$, or $N/2\ MgO(SO_2)_2 + N/6\ SO_2$. By such treatment other carbohydrates in combination with the cellulose proper, e.g., hydrocellulose, oxycellulose, and pentosans are dissolved. Pure cellulose should give perfectly clear solutions in concentrated sulphuric acid which should

only darken very gradually. In many celluloses, such as those from birch and beech woods, the author has found an excess of 0.2—0.3 per cent. of carbon over that corresponding with the formulæ $C_6H_{10}O_5$. He does not regard cellulose as a chemical individual, but as a collective compound, into which both hexose and pentose groups enter. Cellulose is best dried for analysis in the desiccator over phosphorus pentoxide at 60° C. For the determination of cellulose in lignified fibres, Müller's method by alternate treatments with bromine water and ammonia is preferable to Schultze's method. In order to obtain perfectly pure cellulose, however, the treatment must last for eight days, and the cellulose itself is attacked by the bromine; the author estimates a correction of 3 per cent. to allow for this. A rapid colorimetric method for the determination of cellulose is proposed. The procedure is as follows: 22 mgrms. of the sample, equivalent to 20 mgrms. of dry fibre, are dissolved with agitation in 20 c.c. of concentrated sulphuric acid. A color standard is prepared by making a solution in a similar manner of a fibre, the cellulose content of which has been determined directly. The solution of the sample is then adjusted by the addition of alcohol until it is identical in color with the standard; the percentage of cellulose can then be calculated, and the results are said to be accurate to 0.1 per cent.

DRYING WOOD PULP.

The general advice to mills has now been for some years to dry their superfluous pulp so as to keep it from rapidly going bad, and so save a valuable product from destruction. Many mills, however, lose heavily when the market is bad, from two causes: Firstly, the stuff gets more or less spoilt by keeping; and secondly, it has to be sold at frequently less than what it cost to make it. Notwithstanding the fact, however, that many an unfortunate small mill-owner sees his profits, small enough in all conscience, vanishing into thin air, the proper drying of pulp, which would stop all the multifarious complaints one hears about the shocking bad stuff turned out by the mills, and also do a lot towards improving the wretchedly bad prices now prevalent, does not by any means seem to receive the attention from mill men which it ought to. The deterioration of pulp may be prevented, as everyone knows now, in one or two ways: Firstly, by means of some preservative preparation; and secondly, by drying it. Keeping wood pulp by means of a preservative can only be done to a very limited extent, and, as a matter of fact, none of the numerous impregnating substances recommended of recent years will keep pulp satisfactorily for a protracted period of time, much less permanently. Again, if too much of the preservative agent be used the process becomes too costly; if too little be used, then its efficacy is doubtful. The whole matter is, however, a constant source of trouble and anxiety, and cannot be satisfactorily dealt with without some expenditure of money and time of some kind. Keeping superfluous pulp in pits where water is plentiful is a good and tried remedy, and one eagerly adopted when practicable; for stuff so kept, after it has been through the refiner, is just as good as fresh ground pulp; but even in this case also double work is involved, and, consequently, loss of time and money. The only sure and certain way out of the difficulty is to gradually dry the stuff after having first removed all superfluous water up to 50 per cent. by means of a good press. The best method of drying is that employed for pasteboard. As, however, many pulp mills have no steam power, auxiliary heating apparatus will have to be provided. A suitable apparatus can be provided very simply and at little cost in the following way. Nearly every mill has a room or shed of some sort which can be utilized as a drying room, and by erecting a furnace in which shavings, wood waste, and other rubbish can be burnt such a room or shed can be efficiently heated. The hot fire gases should be led through ribbed pipes so as to provide as

large an external radiating surface as possible, and so secure proper distribution of the heat. A plentiful supply of fresh air should be allowed to pass or circulate over the pipes, and means should also be provided for the removal of the moisture-laden air, as in drying pasteboard. If mill owners could only be brought to see the important advantages they would gain by drying their pulp, we should hear fewer complaints about the prices, and the whole pulp trade would be benefited to a very great extent.—Kuhlow's German Trade Review.

OVER-PRODUCTION IN THE UNITED STATES.

The sixty mills of the Paper Products Co. were closed down from December 19th to January 4th in order to curtail the production, which has for several months been in excess of the demand. According to the Boston Commercial Bulletin the only branches of the paper industry in the States where prices can be firmly held without resorting to curtailment are in tissues and writing papers, in which lines the demand exceeds the supply. The mills of the International Paper Co., employing 10,000 men, which closed down last month owing, it is said, to low water, have been re-started.

THE SOCIETY OF CHEMICAL INDUSTRY.

The first meeting in Montreal of the Canadian section of the Society of Chemical Industry of England was held in the Macdonald Chemistry and Mining building of McGill College on December 23rd. The chair was occupied by Dr. Lang, of Toronto University, who referred to the rapidly increasing membership. He wished to impress upon the members that the headquarters were not in Toronto, but the Dominion as a whole. Dr. Lang pointed out that one object of the society was to bring before manufacturers the fact that a trained university graduate was a more suitable person to give suggestions and improve their processes of manufacture than the technical man without any scientific training. The society claimed that a scientific training made a man more fitted to help his employer in the manufacture of anything that required a chemical process.

In the discussion which followed, Dr. McFarlane, the Dominion analyst, said that in connection with the forest there was an immense amount of work to be done. No one was employed in a pulp wood factory to examine and find out if anything could be done in the way of utilizing the waste liquor that was left after transforming the wood into cellulose. Scarcely any care was exercised by the Dominion Parliament and the Legislatures in taking care that there was no waste of the products of our forests. There was no plan for replacing what was taken away. If the Canadian section of the Society of Chemical Industry could induce Parliament to take care of the forests it would be doing a good work.

THE "ROSSED" WOOD CASES.

The International Paper Company, in eight cases, and Gilbert & Bell, of Cohoes, N.Y., in two, protested against the collection of 35 per cent. ad valorem tax on rossed pulp wood imported by them from Canada, and the cases went before the Board of United States Appraisers for a decision. On the decision of these cases hundreds of others, suspended for the present, hinge. The protesting parties were represented by able counsel, while the Government was present with at least four lawyers, who in reality represented pulp wood land owners in this country, who are in favor of the imposition of the duty, as it enhances the value of their own pulp wood.

Rossed wood is wood from which the rough outside of the bark on pulp logs or the bark itself, as well as knots, etc., has been removed. The question at issue is whether the process of "rossing," or

removing the bark, knots, etc., of the wood by a mechanical device so changes its nature as to preclude it from free entry as "pulp wood."

It is contended by the Government that it does, and duty has been assessed on it as partially manufactured wood. The question is one of a great deal of importance, as the wood in this condition is imported in large quantities from Canada, and if the decision is against the importers it is likely that the rossing plants will be moved to this country, although it is much more advantageous to ross the wood on the ground where it is cut.

Counsel for the protesting companies, on the other hand, contend that the custom of the free entry of rossed pulp wood should be continued, as the removal of the bark from the logs does not change the "name, character and use" of the article. They rely somewhat on a decision of the United States Supreme Court, which laid down the rule that the duty on an article could not be changed unless in the manipulation of the article its name, character and use were changed. The fact that the bark has been taken off the logs does not make of them manufactured articles, so the protesters claim.

The hearing began on Dec. 16th, and continued three days, and it will probably be several weeks before the members of the board can examine the mass of testimony taken and digest the arguments offered before they can reach a decision.—Paper Trade.

ELECTROLYTIC BLEACHING.

To many electrolytic bleaching is a terror on account of its heavy cost, and they would on that account rather keep to the cumbrous chloride of lime. A few words, therefore, on the new process and its advantages and disadvantages compared with ordinary chloride of lime bleaching may be of service to those interested.

To bleach cotton, linen, flax, etc., weak solutions containing from two to five grammes of active chlorine per litre of bleaching lye are quite sufficient. For cellulose, which contains a great deal of moisture, practical experience shows that very much stronger solutions containing as much as 20 grammes of active chlorine must be used. Commercial chloride of lime contains only one-third of its weight of active chlorine, and on protracted keeping it loses still more of its available strength. The preparation of the "bleach" solution is extremely laborious, and the disadvantages of the lime residues which persistently adhere to the fibres of the paper, in spite of antichlor, acids, soda, etc., are still worse. Moreover, it encrusts the wires, cloths, felts, and other parts of the machinery, and causes rapid destruction everywhere. The disposal of the waste bleach and wash water into rivers is also often difficult or else prohibited. Electric bleaching possesses none of these evils; a clear solution is obtained, and the waste bleach and wash waters are free from noxious lime residues and the like. The electrical bleaching solution is prepared from ordinary salt, such as common salt (sodium chloride), which can be obtained comparatively cheaply everywhere. The salt solutions which are employed in the so-called electrolyser have a strength of about 10° to 15° Baumé. These apparatus were formerly supplied from the electrical works with platinum electrodes, and both apparatus and plates were hitherto very costly. Haas & Stahl, of Ane, have succeeded in constructing a new automatic apparatus or electrolyser, which requires neither costly centrifugal pumps nor cooling apparatus. This is a great advantage to the paper trade, and the cost of electrolytic bleaching plants is thereby substantially reduced, making their introduction profitable even in small mills, and replacing the objectionable cumbrous chloride of lime bleaching system with distinct advantage. Papermakers will not, and cannot, bear higher expense, and the cost of erection and working must not, notwithstanding the advantages of electrolytic bleaching, be greater than those of chloride of lime bleaching.

The electrolyser can be connected to any existing continuous current electrical plant. After the electric current has been passed through the apparatus in which the common salt solution is placed, the latter is decomposed into its two constituents, i.e., into sodium and chlorine. The sodium is liberated at one electrode, but cannot exist in the aqueous solution, and at the moment of its liberation immediately forms caustic soda with the water. The chlorine is liberated at the other electrode of the apparatus, and immediately forms sodium hypochlorite in the aqueous solution which sodium hypochlorite possesses the bleaching power. The same action takes place with chloride of lime, calcium hypochlorite being formed. In commercial calculations only the effective or available chlorine is taken account of, and is estimated from the sodium hypochlorite, for example.

Supposing, for example, a paper mill has to bleach 6.500 kilos. of stuff daily, and that about 225 kilos. of lime are required; this will yield about 75 kilos. available chlorine, that is, assuming the chloride of lime to be of good quality, about one-third of the weight employed. With chloride of lime at about 18s. per 100 kilos., a kilo. of available chlorine will cost 6½d.

An electrolyser will produce 11 to 15 kilos. available chlorine in ten hours from salt solutions of 10° to 15° Baumé, and the consumption of horse-power increases with increased concentration of the solution of salt, the yield from the salt increasing, of course, also. Where a mill is favorably situated and has power to spare, both factors, i.e., power and salt, may be varied according to requirements and the trend of circumstances, and used accordingly. Where power is cheap, but salt is dear, the solution may completely decompose by long passage of the current. Where power is scarce, but salt is cheap, the salt should not decompose to such a great extent. As a rule, a kilo. of available chlorine may be produced for from 3¼ to 3½d., which, however, as above stated, may vary slightly in different mills, depending on the use of power and salt. Notwithstanding this, however, the price of electrolytically-produced chlorine is much more favorable than that obtained from bleaching powder.

The improved patent electrolyser manufactured by Haas & Stahl, of 'Ane, is provided with automatic means for keeping the liquid in circulation, and, as above stated, requires no pumps or cooling apparatus for the bleaching solution, all of which tends to make the total cost considerably less than formerly. Platinum is no longer employed for the electrodes, very cheap prepared non-metallic plates having been recently successfully substituted for the platinum ones. These prepared plates also have the advantage of being easily removed and cleaned, or replaced by new ones. An electrolyser of this type, with prepared electrodes, will continuously supply strong solutions containing as much as 20 grammes available chlorine per litre, which can be diluted at pleasure to suit the material in hand to be bleached. Provided good circulation of the liquid is maintained, all heating and consequent escape of the poisonous chlorine gas, which is both objectionable and wasteful, is easily prevented. All chlorine is immediately absorbed and transformed into sodium hypochlorite. The complete apparatus is supplied by the above-mentioned firm in its newest and most improved form at a comparatively cheap price, and the total expenses in connection therewith are in the main small. It is now possible for even small mills to discard the old bleaching powder method of bleaching for the improved electrolytic method with advantage.—Dr. B., in Holzstoff Zeitung.

PULP FROM FIR.

The fir tree has always been regarded by most Canadian lumbermen and farmers as a cucumber of the ground. Its fibre is too soft and its life too short to make it valuable for such uses as those to which the spruce tree is put; and the

inevitable balsam makes it objectionable as an ornamental tree.

But there is a possibility that the fir may be made of commercial value as a substitute for spruce in the making of pulp. Raphael G. Zon, of the United States Bureau of Forestry, has been making an exhaustive study of the fir tree in Maine, and finds that it is already used to some extent along with spruce in the pulp mills. It is stated that some pulp manufacturers, who four years ago used no fir, are now using from 25 to 50 per cent. of it, chiefly because they were driven to it by the growing scarcity of spruce in their districts. They have found that fir is the best substitute for spruce that is found in the Maine woods. Whatever is true of Maine would, of course, be true of New Brunswick.

But the mixing of fir with spruce does not produce the most satisfactory results, as the pulp is of an inferior grade. Mr. Zon explains that the balsam fibres are not nearly so tough and strong as are those of the spruce, and the pressure of the grinders which are adjusted for spruce fibres is too powerful for the fibres of balsam, and they are torn and weakened. For the same reason the chemicals used in the treatment of spruce fibres weaken and dissolve the fibres of balsam when used in the same strength. Examples of what can be done with balsam in the manufacture of paper, he points out, are found in France, where the tree is made to produce good book paper. There not only the main trunk, but even the top of the tree is used.

In his report, which will shortly be issued as a bulletin by the Bureau of Forestry, Mr. Zon says that spruce has been cut for many years, while balsam has scarcely been cut at all. Hence, balsam has taken the place of, and is crowding out, the spruce. This change in species of the north woods is hastened by the great superiority of the balsam as a seed tree, for balsam seeds every year, while the spruce seeds only once in seven years. These conditions make it apparent, he says, how very desirable it is that the pulp manufacturers should use balsam wherever possible, for in doing so they not only lessen the drain on the limited amount of spruce left, but they give the spruce a chance to grow and reproduce itself.

CARDBOARD FROM MOSS.

There is an Austrian process by which peat moss can be manufactured into cardboard. Peat moss taken from the large Brock swamp west of Cannington, Ont., was used with excellent results in a test made recently at the Thorah Brick and Tile Co.'s yards, Beaverton. The time may come when our big swamps may be considered one of the country's most valuable assets.

THE WORLD'S CONSUMPTION OF "NEWS."

The world's annual consumption of "news," according to the Holzstoff Zeitung, is estimated at 335,000,000 kilos (a kilo is 2 1-5 lbs.), an increase of 110,000,000 kilos during the last ten years. The total production of paper is stated to be 1,450,000,000 kilos, contributed by 3,986 paper mills. Great Britain, it is computed, has a consumption of paper per head of 6.5 kilos; the United States, 5.7 kilos; Germany, 4.4 kilos; France, 4.2 kilos; Italy and Austria, 2 kilos each, and Spain, .85 kilo.

—The book industry in Germany at present, like many other branches of manufacture and trade, is suffering from over-production. The vast majority of the 25,000 new books issued during 1902 proved to be a drug on the market. This state of affairs makes its influence felt in the bookstores. In small towns many bookbinders sell books of every description as a side line, which increases the difficulties of the retail dealer. The opinion prevails that the retail bookstore in Germany, exclusively as such, has seen its best days.

WHERE THE WOOD GOES.

(Recent statistics show that the vast quantities of wood pulp required to make the paper for the enormous numbers of novels printed is one cause of the rapid disappearance of the forests of North America. The poet takes the usual license with non-cellulose words.)

We ask: "Where have the forests gone?"
The man of wisdom spoke:
"Historical romance has drawn
Upon the weathered oak.

"The novelist whose heroine
No end of sorrow sees—
He is the man who's taken in
The weeping willow trees.

"The summer girl romancer, too,
Has taken at a gulp
Each beech as quickly as it grew
And turned it into pulp.

"The Libby Lady—Laura Jean—
Whose heroes are 'divine'—
Who always has a soulful scene—
Has called for all the pine.

"The problem novelists declare
They cannot get enough
Of wood their doubtful tales to bear—
They call for knotty stuff.

"The David Harums constantly
Old Hickory reduce;
And such books as 'Beaucaire,' you see,
Have need for all the spruce.

"The pirate stories, with their thrills—
With buckos at the helm—
They give us bleak and dreary hills
And take the slip'ry elm.

"The schoolboy stories get the birch;
And Seton Thompson's screeds
Have sent the lumbermen a-search
For dogwood on the meads."

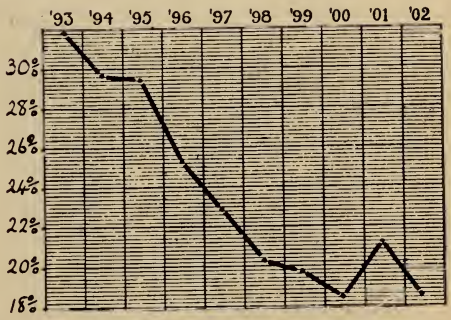
And this is where our woods have gone.
What's left for you and me
To print our labored thought upon.
Except the chestnut tree?

—Chicago Tribune.

CANADA'S PAPER IMPORTS FROM GREAT BRITAIN.

(From the World's Paper Trade Review.)

As the reader no doubt knows, Canada extended to British manufacturers a preference in the nature of a rebate from the duty exacted from non-British productions. From August 1, 1898, British goods entered Canada subject to duty 25 per cent. less than that charged upon goods from other countries. From July 1, 1900, this rebate was increased to 33 1-3 per cent., at which it now stands. Lately, on account of Germany's penal-



izing Canadian produce, Canada had put an extra 33 1-3 per cent. tax on German goods entering the Dominion. To make the meaning of all this quite clear, we append a short table showing the duties Canada charges upon paper in various forms from various countries:

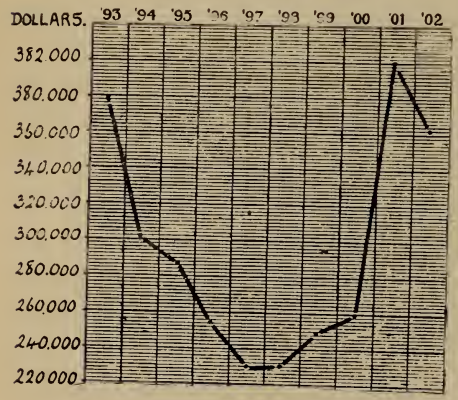
Canadian Import Duties on Paper, etc.

	From Great Britain.	From all foreign countries except Germany.	From Germany.
Collar cloth paper in rolls or sheets, not glossed	10%	15%	20 %
Ditto, glossed.	13 1-3%	20%	26 2-3%
Millboard	6 2-3%	10%	13 1-3%
Strawboard, tarred paper, sand paper, paper bags or sacks, printing paper	16 2-3%	25%	33 1-3%

Playing cards, per pack....	2d.	3d.	4d.
Paper hangings, paper window blinds, envelopes, and paper manufactures	23 %	35%	46 2-3%

The concession there is considerable. In the last group it means that an article from Britain costing 22s. can reach the Canadian buyer at the same price as a similar article from France or the United States at 20s., or as a similar article from Germany at 18s. 2d. In the face of this favoring measure it is natural that we should look to find what effect, if any, it has upon British exports.

We illustrate the course of British exports to Canada during the last decade by means of two diagrams. The second diagram shows how actual values of British imports to Canada have gone, and the first diagram indicates what proportion these values bore to Canada's



total imports of paper. Two facts must be borne in memory. Canada herself is a considerable manufacturer of paper. She has the timber, and a great part of her export trade is in wood pulp—both mechanical and chemical—and she naturally continues the operation of paper-making on a part of her output. The other fact is that in 1900 the largest paper mill in Canada—that of the E. B. Eddy Co., in Hull, Ontario, close to Ottawa, where over 1,000 hands found employment—was burnt to the ground. With the closing of such an important domestic source of supply, the imports increased, and we have the explanation of the upward tendency of the indicating line of our diagram in 1901. Now, what can be said for the preferential tariff in its influence on British exports of paper to Canada? The second table—that dealing with percentages—is the true basis from which to draw evidence. The most we can say is that from 1898, when the preferential tariff came into operation, the downward tendency was less decided than formerly. The year 1901 looks as if the increase in the preference was sufficient to turn the market in our favor, but the subsequent retrogression discounts this idea. Another explanation of the increase of 1901 would be that the class of paper made by the Ottawa mill that was burnt was best procured in Great Britain. Whatever be the true lessons to be drawn from the movements exhibited we leave them to the judgment of the readers and content ourselves with having produced the evidence.

The United States now supplies 75 per cent. of the manufactured paper bought by Canada. Britain is a bad second, and Germany, Belgium, France and Japan appear a long way lower in value of contributions.

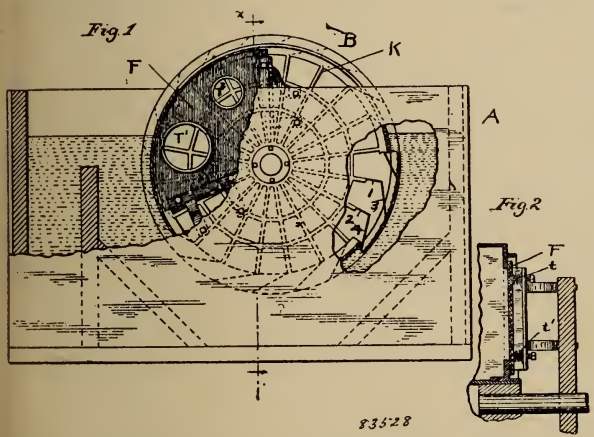
RECENT CANADIAN PATENTS.

The following patents relating to the pulp and paper trade have recently been issued in Canada:

No. 82,802. Carl Kellner, Vienna, Austria.—The process for the manufacture of cellulose by means of the chlorine gas derived from the electrolysis of metallic chlorides, in which the portions of the plants are treated with water, milk, lime, or a weak alkaline solution, and are submitted to the action of chlorine gas derived from the electrolysis of metallic chlorides, whereby the incrusting substances lignines are subjected to such an intensive oxydation or chlorination that by treating the same with hot water, or

if necessary milk of lime or a weak alkaline solution, the said incrusting substances can be removed for the purpose of utilizing entirely, or at least for the greatest part the products obtained at the cathode during the electrolytic process.

No. 83,528. The Improved Paper Machinery Co., assignee of Howard Parker, both of Nashua, New Hampshire, U.S.A. —A machine for treating pulp, consisting of a tank having the roll revolubly mounted therein, compartments arranged in the interior of the roll, a



stationary plate, which is held against the end of the roll, covering part of the compartments as they pass beneath it, means connected with the said plate for laying the pulp, and also independent means for extracting the moisture therefrom.

No. 83,099. C. H. Stern, 47 Victoria Street, Westminster, London, Eng.—The process of forming filaments, sheets or films of cellulose from crude viscose, which consists in insulating the xanthate of cellulose, dissolving, allowing it to stand at an approximately constant temperature, forming it into filaments, sheets or films, and then treating it in a precipitating bath containing an acid or a compound which will liberate an acid.

No. 82,720. The American Paper Feeding Co., Boston, Mass., assignee of F. L. Cross, Mystic, Conn.—A paper-feeding machine, consisting of a feed table, and means for advancing a feathered bank of sheets thereon, a loader comprising a supply table, a curved guideway leading from the supply table to the feed table, a feed drum at one side of the guideway, worm wheels connected therewith, screw shafts engaging the worm wheels, and means for locking them, whereby the rotation of the shafts or worm wheels will move the loader.

No. 83,134. Charles Seybold, Dayton, Ohio.—A paper cutter, consisting of a main driving shaft, a clamp shaft connecting thereto, on which is a pair of cranks, one being loosely mounted thereon, with a bolt to couple said cranks together, a pitman in two parts, frictionally connected, coupling the loosely mounted crank with the main driving shaft, a hand-operated screw and follower, with a connecting lever between it and the clamp-shaft crank, whereby upon uncoupling the cranks the hand clamp mechanism can be operated without disturbing the friction clutch.

No. 82,755. M. L. Heys, Cambridge, Mass.—An apparatus for making articles

No. 82,755. M. L. Heys, Cambridge, Mass.—An apparatus for making articles out of pulp consisting of a travelling mould with two co-operating members constructed to form between them an individual article, means to deposit a layer of pulp on one of the mould members, and to compress said layer between the members during the bodily movement of the mould, whereby an individual article is shaped from the pulp, and means to subsequently discharge each article from said mould. Sixty-seven claims.

No. 82,776. The Laflin and Rond Powder Co., assignee of F. B. Howard, both of New York City.—Apparatus for making pulp vessels, comprising one or more complete moulds, each adapted to form a closed or substantially closed vessel, each having an interior perforated wall and an exterior wall spaced from the interior wall, a pipe leading to a vacuum appliance, and means for removably

attaching the mould or moulds to the pipe, with their interiors in communication with the interior of the pipe, and for holding pulp in suspension. Also means for lowering and raising the complete moulds into and out of the pulp.

No. 82,263. The National Fibre and Cellulose Co., Chicago, assignee of G. R. Sherwood, Oak Park, Ill.—The improvements in the manufacture of products from Indian corn, or analogous plants, consisting in separating the pith from the fibrous portion of the stalk, thereafter separately digesting each for the purpose of dissolving the intercellular structure of the shell and reducing pith to a suitable glutinous condition, and thereafter uniting the same.

Also No. 82,264. The process of manufacturing cellulose products from the stalks of Indian corn or analogous plants, consisting in mechanically severing the pith from the shell before cooking or chemical disintegration, and thereafter separately digesting the pith until it reaches a plastic and adhesive or glutinous condition, substantially as herein described.

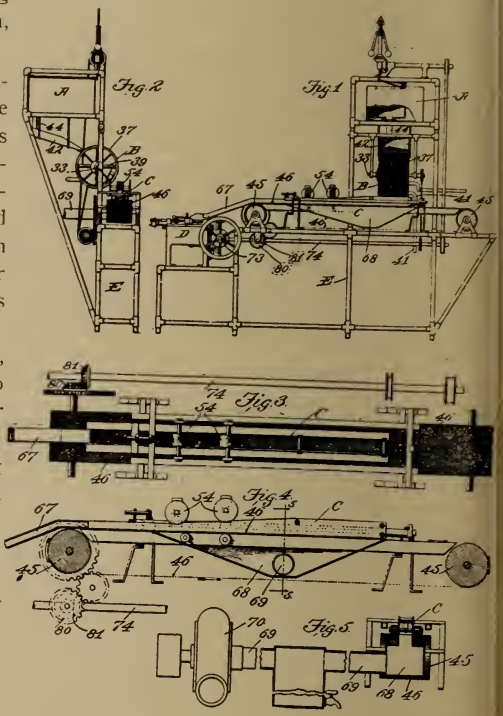
Also No. 83,352. A husking mechanism, consisting of nipping rolls adapted to remove the ears from the stalks, a pair of inclined parallel rods, one above the other, having longitudinal intermeshing slats or ribs, and rotating toward each other, means for conveying the ears from the nipping rolls to said inclined rolls, teeth at intervals on the ribs of the lower roll, and an endless carrier having curved fingers adapted to convey the ears longitudinally of said rolls and present them to the lower roll in advance of its engagement with the upper roll, for the purposes described.

PROCESS OF TREATING PULP.

Julian H. Rivers, of St. Louis, Mo., assignor to the United States Fibre Stopper Company, of St. Louis, Mo., a corporation of South Dakota, has been granted a United States patent (No. (748,014) on a process of treating pulp. It is described by the Paper Trade Journal as follows:

Fig. 1 is a side elevation of an apparatus for carrying out the inventor's process. Fig. 2 is an end view looking from the left of Fig. 1, the forming machine being removed and the exhaust pipe being broken. Fig. 3 is a top plan view of the condensing mechanism. Fig. 4 is a central longitudinal sectional elevation of the same, and Fig. 5 is a transverse sectional elevation on about the line 5 5 of Fig. 4.

The pulp in the very fluid condition in which it appears when mixed is spread in a relatively broad, thin sheet, and a large proportion of the moisture is ex-



tracted, so that the pulp is presented in a thin web. In order to effect this preliminary drying the pulp is preferably spread over a reticulated surface, by means of which the water is permitted to rapidly pass off, and the thin web of pulp is readily delivered from such surface. The thin web is then piled, and this pile of pulp is compressed or condensed, certain moisture being expelled from the pulp during this compressing or condensing action. Preferably between

the time that the pulp is piled and that at which it is compressed or condensed moisture is extracted. A convenient means of effecting the desired steps after the pulp is formed into the afore-mentioned thin web is to deliver the web on a reticulated carrier, so that the thin web can pile upon the carrier as it is delivered from the surface upon which it is preliminarily dried, and this carrier carries the piled pulp to suitable condensing or compressing devices, the openings in the carrier permitting the moisture to escape from the pulp upon the same.

In the drawings E indicates a frame of any suitable construction by means of which the parts of the apparatus are supported. A represents the vat or hopper for receiving the pulp to be treated. B indicates the preliminary drying apparatus, C the condensing mechanism, and D the forming machine for acting upon the stock treated.

The preliminary drying device is supported below the hopper A, and is here shown as comprising a cylindrical screen 37, supported upon a suitable shaft 33, this shaft preferably supporting a drip cup 39 within the screen, said drip cup being adapted to receive moisture escaping from the pulp spread over the screen, and having at its lower portion a discharge pipe 41. A spout or delivery pipe 44 delivers the pulp from the hopper A upon an inclined trough 42, and this trough delivers to the said screen 37. The trough and screen are relatively wide, so that the pulp is spread upon the rotatable screen in a relatively wide thin sheet, whereby the water readily escapes from the pulp mass and falls into the aforementioned drip cup, a sufficient quantity of water escaping to cause the pulp to be delivered from the screen in a thin web.

Upon suitable rollers 45 is a conveyor screen 46, which is below the cylindrical screen 37, and adapted to receive the thin web delivered from the said cylindrical screen. The screen 46 travels in a line substantially parallel to the axis of rotation of the screen 37. Suitably supported above the conveyor screen and between the delivery end of the same and the point at which it receives the pulp from the preliminary drying devices is a series of compressing rolls 54, adjustably mounted in any convenient manner, these rolls being at different heights from the surface of the conveyor screen, and gradually approaching the screen toward its delivery end. The conveyor screen is shown in the drawings as delivering to the feed trough or raceway 67 of the forming machine D.

Intermediate the top and bottom sheets of the conveyor screen is a box or casing 68, having an open top, over which the pulp receiving portion of the conveyor screen travels, and an exhaust pipe 69 leads from said casing to the eye of an exhaust fan or similar device 70.

A main shaft 74 receives power from the shaft 73 of the forming machine, and through suitable connections, as beveled gears 80 and 81, imparts rotation to one of the rollers 45. Said shaft 74 is also connected to the shaft 33, upon which the rotatable screen 37 is carried. The driving connections are such that the screen 37 rotates at a relatively high speed compared to the rate of travel of the conveyor screen 46, by reason of which the screen 37 can feed the thin web to the conveyor screen 46 with sufficient rapidity to cause this web to pile upon the conveyor screen. The piled pulp is then fed to the condensing rolls 54, and is condensed to the desired consistency, the fan 70 serving to suck certain of the moisture from the pulp on the conveyor screen.

Forestry and Pulpwood

The Federal Minister of Public Works was interviewed recently by representatives of the lumber and pulp companies and the settlers of the Spanish River district regarding the obstruction to navigation of the Spanish River by the booming of sawlogs. The Minister, after hearing both sides, advised the parties to get together and draw up a scheme for submission to him. Nothing definite has yet been decided.

The Danahar & Melendy Company, of Detroit, have closed a deal for the purchase of 200 square miles of spruce and cedar lands in Quebec Province, the price being understood to be about $300,000. Sawmills, logging roads, etc., are included..

G. W. Henderson, acting manager of the United Lumber Co., has been appointed manager of the Gaspereaux Company, which operates about 45,000 acres of timber land in the neighborhood of Kentville, N.S. Mr. Henderson stated that he expected a large output of lumber during the coming season from all the companies operating in Nova Scotia. The United Co. alone would cut about ten million feet on the St. Mary's property, lately purchased by Alfred Dickie, and would also have about eight million of logs at their Jordan River mills.

A conference of delegates from various county councils of Wales was held recently to consider the question of establishing a school of forestry. Mr. Robinson, of North Pembroke, pointed out that there were a million acres of waste land in Wales which, if planted with trees would in thirty years be worth $200,000,000 to $250,000,000, while the total outlay of planting would not exceed $15,000,000. A single acre could be planted for $30, and in thirty years' time it would be worth $200 to $250. It was resolved to establish a school of forestry for the principality.

Shipments of logs from J. R. Booth's limits above Madawaska to his mill at Ottawa form an important item in the traffic of the Canada Atlantic Railway. The logging line connecting the main line near Egan estate, which was extended five miles last summer, having opened up a new timber country, large numbers of logs will be secured this season. They are loaded on to the cars in the bush, and the trip is made in twenty-four hours from the stump to the saw. Formerly these logs had to be sent down the Madawaska river, and in low water seasons did not reach the mill until a year or so after they were cut.

A shortage of a hundred million feet of the estimated season s cut of Ontario is reported by Moore and Roe, inspectors of the National Lumber Trust of Chicago, who have returned to Toronto from the logging camps. Mr. Roe stated that the shortage was very marked in chopping, due to lack of men. The yield of the Georgian Bay Lumber Company alone would be reduced this year to 60,000,000 feet as compared with over 80,000,000 last year. With the other large companies the falling off was even worse. No satisfactory explanation could be given for the scarcity of choppers. A man could earn $2.50 a day with his board, but dissatisfaction existed as to the methods of payment, and the treatment they received from sub-bosses.

E. B. Eddy is reported to have stated his views regarding the export of pulpwood to the United States in the following terms: "At the present time Canada is exporting 1,000,000 cords of pulp wood annually. The result is that Canadian forests are being depleted for the benefit of the United States and to the detriment of Canada. I have advocated a duty of $4 a cord on pulp wood. This would mean the establishment of a large number of mills here. These mills would bring in from $3,000,000 to $5,000,000 per year. The country is full of water-powers from Quebec to the Lake of the Woods, each one of which would become of value for manufacturing purposes." He adds that 60 per cent. of the paper made in the United States is manufactured from Canadian wood or wood pulp.

Referring to the lumber outlook in Quebec and Nova Scotia the "Montreal Star" states that several shippers of spruce deals have tried to close contracts for next season's stock at prices which ruled last year, but it is understood have not been successful, and that manufacturers are asking an advance. Now that the Ottawa Valley pine production has commenced, it is expected to facilitate the closing of contracts for spruce stocks. Manufacturers ask an advance on the ground of increased cost of production. In Nova Scotia the quantity of spruce deals manufactured this year will

probably show a considerable decrease owing to forest fires on lands that had been logged before. The small logs remaining will be cut, but very few of them will be large enough to produce deals for the British market. The Nova Scotia mills have sold practically all the lumber cut last year. Enquiries are being received for stock for shipment to New York, where spruce is selling at the highest average prices ever obtained.

The Clanny newspaper, Glace Bay, N.S., has amalgamated with the Gazette, which after February 1st will appear as a daily.

The Ontario Government has passed an order-in-council awarding the contract for paper for the next five years to the Riordon mills, of Merritton. The price is below what the Government has paid previously. The contract, it is understood, amounts to between $10,000 and $12,000 a year.

A report to the Ottawa Free Press states that the British Columbia Government is succeeding in its efforts to keep American mill-owners from obtaining their log supply from the British side of Puget Sound. In retaliation for the American tariff on Canadian lumber, the British Columbia Government has imposed restrictions which make it impossible for the American mill men to operate camps in British Columbia.

The ex-Minister of Public Works is not afraid to give his opinion of the kind of patriotism that animates the present Quebec Government in connection with the pulp industry. At a convention in Montcalm county the other day Mr. Tarte pointed out the possibilities of the pulp industry, and denounced the shameful squandering that the Parent Government is allowing to take place in sending the raw material out of the Province. The Americans will not buy from Canada when they can help it. The best market for Canada, besides the home market, which could be largely extended, is England. The ex-Minister commended the Chamberlain proposals.

A Quebec correspondent, writing on the subject of our recent articles on the pulp wood question in that Province, says: "So far as the provincial statistics are concerned in Quebec they are of no value, as our Crown Lands Blue Book is made up of reports from different agents over the country, which are absolutely unreliable for statistical purposes. A Forestry Bureau should be established here with skilled, intelligent men in charge of it. We have nothing of the kind now. The fact is that no Minister of that Department has ever set himself earnestly at work to reform our whole system. The management of our Crown lands up to the present date has been more in the direction of getting an annual revenue to cover the financial deficit than to foster our greatest source of wealth. Our Statistical Department of the Province of Quebec is of the most primitive kind, and so far as I have seen is of very little assistance to anyone seeking facts as they are."

A report states that the cut of timber in the district tributary to the mills of the Fox River valley of Wisconsin this winter will be enormous. About 10,000 men are at work in the woods of the Duluth district, and 2,500 more are working on spruce for the pulp mills, and some of this cut is for mills as far east as Buffalo. The report goes on to state: "Never before has the cut amounted to more than 40,000 cords. Now it is 120,000 carloads of spruce. More than 10,000 carloads of spruce will be shipped from Duluth to paper mills this winter and the following summer. The cost of rail freight alone on the wood will average about $40 per carload, or $400.000 to the roads, and the value of the wood delivered on track at Duluth is about $600,-000. Paper making concerns of the central west are scouring the region for timber lands, and the value of such lands is rapidly advancing. It is thought that the advance has scarcely begun. Hundreds of thousands of acres tributary to Duluth, and reached, or soon to be developed by railway lines, are covered by spruce timber."

In the course of his address at the annual meeting of the Canadian Bank of Commerce Byron E. Walker, the gen-

eral manager, said: "At the recent sale by the Ontario Government, however, experienced lumbermen paid such sums per mile for limits as would hardly seem warranted unless we are to face, permanently, new conditions as to the value of all lumber products. We are glad to see that the Government of Ontario, which has just had such ample evidence of the value of our remaining timber, is about to aid in forestry research in our Provincial University. We can but hope that the work of the Canadian Forestry Association, of the Provincial Directors of Forestry, where such an office has been established, and of forestry departments in our Universities, may some day bring large practical results in the way of further segration of the country as to timber preserves and in replanting on an extensive scale. The large revenue derived from annual cutting on quite small timber reserves by European Governments should tempt our politicians, if they have any concern for their successors in office, or for the people. In the Maritime Provinces the forest fires during the past summer will doubtless cause an increase in the cut this winter because of the necessity for prompt work in burnt areas, and this, in view of a probably restricted demand at home and abroad, seems unfortunate. The cut of New Brunswick for the past year was about 130,000,000 feet, and the business has been as a rule quite profitable."

Mill Matters

The London, Eng., Gazette reports the winding up of the British Columbia Pulp and Paper Mills, Ltd.

The Cornwall Paper Manufacturing Co. are advertising for tenders for the erection of their new paper mill at Mille Roches Station, Ont.

Alex. McArthur & Co., Montreal, whose factory and paper mills were destroyed by fire in September, have completed the new factory on the site of the old one. It is the same size, but the machinery will be the most modern.

The Brompton Falls, Que., pulp company will soon erect a $300,000 paper mill containing an equipment of four machines of the largest type.

Scarcity of water in the River Chicoutimi has forced the pulp mill at Jonquiere, Que., and other establishments in the vicinity to suspend operations.

The Ottawa Free Press states that J. R. Booth's new pulp factory at the Chaudiere will be in operation early in the spring, and will be run night and day. The mill will have a capacity of between 75 and 80 tons of ground pulp per day, and will employ 150 hands.

A curious accident occurred at the Riordon Company's Paper Mill, Hawkesbury, Ont., a few days ago. One of the pumps became stuck, and in endeavoring to start it James Walsh had resource to a crowbar. The pump starting quicker than expected, the crowbar was hurled violently from Walsh's hands, and struck him on the head, breaking his jaw. The same day G. W. Higginson had three fingers badly cut while working at a planer.

The West Coast Pulp and Power Company, B.C., whose spruce limits are situated in the interior, will erect a mill for the manufacture of pulp at a cost of $500,000 as soon as the timber limits are surveyed. G. D. Scott, a director, states that although this is the third mill to be erected in the Province, there is ample room for all in the markets of the far East, where British Columbia will come in competition with American concerns which ship their pulp from a greater distance.

The Ontario Government have extended the time for the completion of the Montreal River Pulp and Paper Co.'s works. The agreement called for the expenditure of $100,000 by September last; $200,000 by March next, and further $200,000 by March next year, the mills to be erected on the Montreal River or on the Ottawa River, above the town of Pembroke. The incorporators are: P. McArthur, Detroit; W. C. Phillips, C. D. Warren, W. Kerr, and E. F. B. Johnston, of Toronto.

The Fisher Paper Mills, Dundas, Ont., are installing a number of new machines in the addition recently made to their mills.

The Sturgeon Falls Pulp Company's mills are now turning out over fifty tons of paper per diem, which is being shipped to all parts of the world.

The employees of the finishing-room of the Toronto Paper Co.'s mill, Cornwall, Ont., presented Edward Fields with a gold pin and necktie on Christmas Eve.

On December 29th Charles Ware, an employee of the Riordon paper mills at Merritton, Ont., had a leg broken in three places while assisting in placing an engine. A falling skid hit him.

W. J. Finlay & Company's new mill at Strathcona, Ont., will be in operation by the end of February. It is understood that the firm will continue to manufacture manilla and other wrappings, also printing papers.

John C. Kaine, of Quebec city, has purchased from Ives Bouillion, of Tadousac, Que., a timber limit of fifteen square miles at Bergeron, fifteen miles east of Tadousac, on the St. Lawrence. The limit is well wooded with cedar and spruce, and includes a small mill. The purchaser intends to manufacture pulp wood.

Wm. F. Brooks, of Minneapolis, a director of the Rainy River Lumber Co., is at Fort Frances to arrange for construction of the power dam and mills. Mr. Brooks states that the mills will be in operation by May, and that its capacity will be 70,000,000 feet yearly. Also, that as soon as power can be supplied manufacturing industries will be established on both the Canadian and United States sides of the river. The principal works of the power company will be on the Canadian side.

The dividends declared by the leading British paper mills during the past year bear favorable comparison with the previous year. The highest dividend was paid by the Kellner-Partington Company, viz., 15 per cent. This, however, was 3 per cent. less than a year ago. The Burnley Company paid 12½ per cent., an advance of 2½ per cent. The East Lancashire dividend paid 10 per cent. against 7½ per cent., and Peebles & Co. paid 3 per cent. against nothing last year. Other mills paid from 5 to 10 per cent.

The annual meeting of the American Paper and Pulp Association will be held at the Waldorf-Astoria hotel, New York, on the 10th February, the convention and dinner being confined to a single day and evening. The American Sulphite Manufacturers' Association will hold a meeting on the same day, as will also the new organization of paper dealers, called the National Paper Trade Association. The Tissue Paper Manufacturers' Association is arranging for a meeting on the 9th February, but will no doubt be represented at the convention of the 10th.

J. J. Warren, of the British Canadian Pulp Co., has written the council of North Bay, Ont., stating that he had not been successful in interesting British capitalists in the enterprise there, but that Mr. Flemming, the Scotch capitalist, and some personal friends were prepared to subscribe a sufficient sum to construct a mill of about half the size of the one first proposed if the council would extend the time of the agreement to December, 1906, and pay the $15,000 bonus if the mill should be ready for operations within that time.

The United States consul at St. John's, Newfoundland, in a recent report to Washington makes the following reference to the lumber industry: "The company, headed by H. M. Whitney, of Boston, has acquired several large properties in the colony, and is operating them on a hitherto unequalled scale. Geo. J. Barker, of Boston, has also acquired a large grant, and is developing it extensively. An American syndicate is now negotiating for forest tracts on the west coast for charcoal manufacture as well as ordinary lumbering. There is room for the sale of large quantities of American machinery for lumbering and pulp making. A. Harmsworth, the great Lon-

don publisher, has secured a large forest area, and is now arranging for the establishment of a pulp and paper making plant to cost $2,500,000.

The Canada Paper Co. has got its steam power plant at Windsor Mills now in such shape that with the assistance of the water power available the mill is running to its full capacity.

The E. B. Eddy Co. is placing on the market a hoopless antiseptic jam pail made of chemically treated pulp wood fibre. It is impervious to water, and is said to be as cheap as the old wooden pail.

The pulp and paper and textile mills along the Magog, St. Francis and other rivers of the Eastern Townships are still suffering from low water, and there is little likelihood of any relief until spring, unless as the result of some extraordinary spell of thawing weather. Two pulp mills have been knocked out of business for the past three months.

The Canadian creditors of the "Soo" companies have served notice on the general officer in charge of the properties that a liquidator of the subsidiary companies was being applied for. They contest the control of the affairs by Speyer & Co., and ignore the sale of securities recently held in New York. F. H. Clergue, who has been working with his accustomed energy to secure capital sufficient to regain control, is now said to have lost heart.

A correspondent to the Paper Mill reports that an extension of the Norwood and St. Lawrence Railroad to the St. Lawrence River is proposed. The latest scheme includes the development of the water power at Kent's Mills, on the Racquette River, four miles from Massena Springs, and engineers are now surveying for the line. The fact that the greater part of the pulp wood now used in the Norfolk and Raymondville mills comes from Canada via the Grand Trunk, thence to Norwood on the New York Central, and to Norfolk on the Norwood and St. Lawrence, makes it probable that the road will go through Massena. The Remingtons and other owners of the Norfolk and Raymondville paper plants are the owners of the Norwood and St. Lawrence line.

H. M. Thorne, who has been with the Canada Paper Company for some twenty years, during a part of which time he has had charge of the company's accounting department at Toronto, has been promoted to the position of chief accountant and inspector, with headquarters at Windsor Mills. Mr. Thorne's advancement is well merited, and has been secured by conscientious, hard work. F. B. Wheatley, assistant bookkeeper at the Montreal house, takes Mr. Thorne's place in Toronto. Under the energetic management of H. B. Donovan, who is regarded as one of the landmarks in the printing and kindred trades of Toronto, the Toronto business of this company has made great advances.

Robt. M. Thompson, of Tacoma, Wash., who made the proposition to establish a mill at Bella Coola, B.C., referred to in our November issue, has promoted a company called the Bella Coola Pulp and Paper Co. under the laws of the State of Washington, and has made an agreement with the farmers of Bella Coola district in substance as follows: If he establish a mill of 125 tons of pulp per day—half the capacity to be in operation within two years and the balance within three years—they will allow him to take pulp wood from their farms free. The settlers under this agreement dispose of timber from 6,700 acres, chiefly in spruce and cottonwood, but fir and cedar is included. The agreement is operative for forty-two years.

Charles H. Vogel, paper mill architect and hydraulic engineer, of Ottawa, Ont., reports that he has the plans for a mill for the Nepigon Pulp, Paper and Manufacturing Company under way, to be located on the Canadian Pacific Railway, about 80 miles east of Port Arthur. The paper mill will be equipped with two large, fast-running paper machines, and the pulp mill will have a daily capacity of fifty tons. The plant will be so built as to make possible a doubling of its capacity at a later date. Another new

plant under Mr. Vogel's supervision, and recently referred to, is the Rainy Lake Pulp and Paper Company, at the head waters of the Rainy River, on a stream which will develop 8,000 horse power. The company has concessions for the water power, together with 272 square miles of timber lands. The mill site will have railway connections by the time construction begins in the spring.

NEW COMPANIES.

The Dominion Paper Box Co., Ltd., Toronto. Capital, $395,000. To take over the business of the Dominion Paper Box Company, and to manufacture and deal in paper, paper box board, paper boxes and paper products of all kinds. A. Jephcott, C. Jephcott, W. Jephcott, Harriett A. Jephcott and Amelia E. Jephcott, of Toronto.

The Northern Industrial Co., Ltd., Montreal. Capital, $50,000. To manufacture charcoal and its products, with the privilege of manufacturing the products of the earth and converting them into chemical products, pulp, paper, cardboard, etc. R. Préfontaine, Hermantine R. Préfontaine,, the Hon. R. Préfontaine, J. L. Perron, of Montreal; Louis Parent, of Ste. Agathe des Monts, Que.

Alex. McArthur & Co., Ltd., Montreal. Capital, $180,000. To manufacture all kinds of paper and paper products, pulp and tar, including by-products of tar and pitch, to acquire timber limits, water power and rights, and to acquire the business of the late Alexander McArthur, F. Robertson, C. McArthur, Jessie McArthur, D. Munn, and M. G. Lockerby, of Montreal.

The Carney Lumber Co., Ltd., Massey, Algoma. Capital, $500,000. To manufacture and deal in lumber, timber, logs and wood of every description and all by-products thereof. J. S. Lovell, W. Bain, R. Gowans, E. W. McNeill and R. Richardson, of Toronto.

The Rainy River Lumber Co., Ltd., Rainy River, Ont. Capital, $1,000,000. To carry on the business of lumbering, and to manufacture articles in the making of which wood is required or can be utilized, and all business incidental thereto. I. H. Shelvin, E. W. Backus, E. L. Carpenter, W. F. Brooks and G. S. Eddy, of Minneapolis, and J. A. Mathieu, of Rainy River, Ont.

The Telford Lumber Co., Ltd., Prince Albert, N.W.T. Capital, $368,000. To manufacture and deal in timber and all products of same. J. N. Telford, D. H. Telford, H. A. Beard, J. W. Telford, of Prince Albert, N.W.T.; W. A. Telford, of Benson, Minnesota, and Mary J. Telford, of Winnipeg, Man.

The La Ferriere Lumber Co., Ltd., Montreal. Capital, $120,000. To carry on the lumber and pulp wood business in all its branches. P. La Ferriere, S. P. Stearns, R. Forget, D. Coyle, and R. Fielder, of Montreal.

Foster-Brown Co., Ltd., Montreal. Capital, $20,000. To acquire the business of William Foster Brown, and to carry on the business of booksellers, publishers, stationers, printers, envelope and account book manufacturers, etc. W. F. Brown, F. Brown, H. Brown, Hannah C. Macdonell, and H. Booth, of Montreal.

Jaffray Bros., Ltd., Galt, Ont. Capital, $20,000. To purchase the business of Jaffray Bros., and to carry on a general printing and publishing business, including manufacturing paper boxes, etc. R. M. Jaffray, J. P. Jaffray, Ada E. Jaffray, A. G. Donaldson, T. Arntfield, of Galt, Ont.

The Great West Lumber Co., Ltd., Victoria, B.C. Capital, $100,000, and the Great Northern Lumber Co., Ltd., Victoria, B.C. Capital, $25,000. Both to carry on the business of lumbering and to manufacture all articles in conjunction therewith.

The Canada South African Lumber and Produce Co., Ltd., Montreal. Capital, $50,000. To purchase or lease timber limits, and to carry on the lumber and timber trades in all their branches; also to construct, acquire and operate mills for the manufacture of wood pulp, pulp, paper, cardboard, paper materials, all products thereof, and all articles used

in connection therewith, and generally to carry on the business of manufacturing wood, pulp and paper in all its branches. G. A. Campbell, J. W. Macdougall, O. W. Pease, L. Skaife, and A. E. Abbott, of Montreal.

The Bright Stationery Co., Ltd., Vancouver, B.C. Capital, $10,000. To carry on the business of wholesale and retail merchants in stationery and other goods.

C. Flood & Sons, Ltd., St. John, N.B. Capital, $100,000. To carry on the business of wholesale and retail dealers in stationery, etc. Carson Flood, E. H. S. Flood, G. H. Flood, T. J. Flood, and W. A. McLaghlin of St. John, N.B.

Paper Consumers.

The Oracle newspaper office at Olds, Alberta, was recently destroyed by fire.

H. S. French, formerly of Orillia and Coldwater, Ont., has started a paper at Port Arthur, called the Western World.

Manufacturers of, and wholesale dealers in, wrapping paper have decided to shorten their terms of credit, which terms now are 60 days net; 30 days 2 per cent., instead of 90 days net and 30 days 3 per cent.

The Almonte Gazette states that Geo. Barcley, of Brockville, has in his possession a copy of the London, England, Gazette, published in the year 1530. The paper was then issued in pamphlet form, with heavy black type.

Kerr & Thomson have issued a writ against Charles Reid & Co., paper box manufacturers, Hamilton, Ont., on behalf of Thomas Love, Jr., for $1,000 damages for an injury received while working at a corner-cutting machine, four fingers being cut off his right hand.

Fire gutted the Niagara Falls (Ont.) Review printing house on January 6th. It started from the furnace in the press-room, and made great headway before discovered. The building was saved, but the press and composing-rooms were wrecked. The damage is partly covered by insurance.

Jas. A. Evoy, of the Kemptville Telegram, has severed his connection therewith, and will establish The Carp Review and County of Carleton Advertiser at Carp, Ont.

The State Government of Kansas is distributing free of cost about 2,000,000 young shade trees to the farmers and land owners on its western border every spring, and it is not unusual for a Kansas farmer to drive fifty miles for a load of young trees. The effect on the country is already marked.

At a meeting of wholesale paper men in Montreal, on December 22nd, terms and discounts were discussed, the idea being to come to some general understanding which will tend to greater uniformity in the future. The breaking of packages for the smaller dealers was one of the items, and it was decided to make a uniform advance in price on all such lots. Toronto dealers have an understanding amongst themselves, and the Montreal traders intend to work in conjunction with them in the future.

The case of Remington-Martin Company vs. Greene et al. at Sweetsburg Que., last month involved an important question affecting sales of movables by a bailiff. On a debt, including costs, of about $99, a creditor seized and the bailiff sold pulp wood and logs of the value of about $3,000 for $410. The company pleaded to set the sale aside on the ground of illegality, fraud and collusion. The defendants strenuously contested on all points, but judgment went against them.

PERSONAL.

Mr. Boothe, of Niagara Falls, N.Y., has been appointed superintendent at the Riordon Paper Mills, recently vacated by Richard Fawell.

G. W. Tate, having left the Canada Paper Company's St. Francis Mills, is replaced by P. Burns, formerly foreman at the Spring Vale Mills. The latter position has been filled by the appointment of A. Larue.

Ed. B. McKay, a well-known Winnipeg newspaper man, has assumed control of the Yorkton, Assa., Enterprise.

Edward Trout, secretary-treasurer of the Toronto Paper Manufacturing Co., is spending the winter at Palma Sola, Florida, and does not expect to return to Canada till about April.

A. S. Fairbanks, engineer in charge of construction at the Imperial Paper Mills, Sturgeon Falls, Ont., was tendered a complimentary dinner by the papermakers on December 14th prior to his departure for New York on the completion of the work.

Daniel McMaster, a director and manager of McMurray's Royal Paper Mill, Limited, London, Eng., has been appointed general manager to the mills of the Oxford Paper Company, Rumford Falls, Me. Mr. McMaster, who has for many years been a prominent figure in paper trade circles in the south of England, will, it is understood, engage a number of English paper makers to occupy positions under his management.

Peter McArthur will be manager of W. T. Stead's new paper in London, Eng. Mr. McArthur, who is a native of Ekfrid, Ont., has been in England for some time contributing to Punch. He is about to publish a book of humorous reflections from the colonial point of view on the manners and methods in England. Mr. McArthur did his first writing for the press as correspondent for the Glencoe Transcript while attending Wardsville High School in the eighties.

J. C. Crome, late manager of the Toronto Type Company's Western Canada business, with headquarters in Winnipeg, Man., is now manager of the Western Printers' Supply Company, a new company composed largely of Winnipeg and Manitoba business men, which will start business about February 1st. The new house will carry printers' supplies, and will also engage in the ready print business. G. A. Patterson, of Deloraine, will be president, and James Hooper, King's Printer, secretary-treasurer.

The pulp and paper industry of Canada has lost one of its most sterling business characters in the death on December 28th of William Currie, president of the Dominion Paper Company and of the Jacques Cartier Pulp Company. In addition to conducting a large paper business, Mr. Currie and his brother carried on very successfully for many years a large trade in chemicals and raw materials used by other paper and textile mills. Mr. Currie had been a resident of Montreal for thirty-five years. He was born in Scotland sixty-eight years ago. There are left to mourn his loss two sons, Robert and William, and two unmarried daughters.

CANADA'S BIG ASSET.

In the course of a recent lecture upon Canada's wood pulp resources Prof. D. B. Penhallow gave some interesting information. After sketching the early history of paper among the Egyptians, Chinese and Pacific Islanders, he pointed out that the earliest papermaker from wood was the hornet. This insect stripped fibres of wood off a cedar post, and from them constructed a nest able to withstand the weather, whose six layers were only one twenty-fifth of a millimeter thick. He separated the fibres of the wood in precisely the same way as the modern pulp-maker does.

In 1897 the export of wood-pulp from European countries was worth nearly $16,500,000, and in 1900 nearly $18,000,000, and this was only a small part of the whole industry. The United States census of 1870 said there were eight pulp mills at work; in 1880, fifty; in 1890, 82; and in 1900, 763, employing a capital of $167,507,000. The figures for Canada showed a like rapid increase which resulted in the existence in 1900 of forty mills, and the projection of nineteen others. The output that year was 470,700 tons of pulp, and the export to the value of $598,874. In 1901, $1,250,000 worth was exported, showing an increase of 113 per cent.

The lecturer then described the processes to which wood pulp was subjected, taking the works at Grand Mere as his example. The United States, according to official returns, takes from Canada pulp of 349,084 cords of wood, of the value of $2,250,000, equal to 28 per cent. of their total consumption. They prefer the woods from the north, as they make the best pulp, and the supply seems inexhaustible. Spruce grows nearest the Arctic regions of any tree. Dr. Robt. Bell estimated the Canadian forests at 2,595,000 square miles, with 16,500,000,000 cords of spruce, while the conservative statements of the Dominion statisticians placed them at 1,400,000 square miles, producing 4,500 million tons of pulp. The operations in the woods were then described, and the treatment of the logs in the factory.

After describing the making of pulp, the question of the effect on the forests of the appearance of this new industry was next discussed. A great deal of the danger of disafforestation is due to forest fires, and the carelessness of lumbermen. Thus, the leaving of a stump three feet high instead of seventeen or eighteen inches means a loss of $120 per 1,000 acres. The refusal to use logs below a certain diameter causes $95, and the leaving of the skids, used to move timber, $100 a 1,000 acres, to be thrown away. Then there are other extravagances, less easily calculated, to be reckoned with. The question of afforestation was also considered. If all timber of five inches diameter is cut, the forest will take from fifty to seventy-five years to grow up, but if no tree less than twelve inches is taken, operations may be resumed in twenty-four years. The lecturer advocated the regulation of this matter by Government,as it was too much to expect any but the most enlightened private owner to regard it from the public point of view. The lecture was closed with a few remarks on the hard life of the lumber camps, which is now in some cases being ameliorated by the institution of reading rooms and travelling libraries.

—Attention is directed to the advertisement of the Peter Hay Knife Co., Ltd., of Galt, Ont., makers of all classes of machine knives, including barker knives, chipper knives and paper cutter knives. This old firm has an excellent reputation for the quality of the goods it produces.

—A deputation of wallpaper manufacturers interviewed the Minister of Customs the other day on tariff matters. Mr. Williamson, representing Colin McArthur & Co., Montreal; Mr. Boxer, of the firm of Watson & Foster, also of Montreal, and Mr. Staunton, of the firm of Staunton, Limited, Toronto, formed the deputation, whose interview related to the competition of United States wall paper manufacturers.

—From the news we have received from Sweden it looks as if our correspondent had been somewhat premature in his statement that the proposed Scandinavian pulp syndicate would become a fact, because it appears that even the 300,000 tons which were wanted to form a smaller syndicate have not yet been subscribed. We think the Scandinavian pulp makers who hesitate to join this smaller syndicate are wise, as it is obvious that a small syndicate must necessarily end in a failure, a conclusion justified by the past experience of smaller syndicates. Whatever may be the result of the agitation in favor of a syndicate, about one thing the pulp makers joining may not be mistaken: The English papermaker has enough experience of syndicates to be able to judge about the fine common phrase, viz., founded in the "interests of papermakers." The papermaker will never favor any syndicate, however small it may be, and however favorably it may be represented to him; he wants to buy his pulp of whom and where he likes, and would rather pay a somewhat higher price to the single pulp mill outside the combination than be dependent on a syndicate.—World's Paper Trade Review.

PAPER STOCK MARKET.

Montreal, 18th Jan.

The scarcity of water in the smaller rivers in Eastern Canada still continues. Reduced water power, severely cold weather, and the annual stock taking, acting together, have made a very dull market for paper stock.

Rag collections are small, and paper stock rags, especially cottons, are scarce, and any unusual demand would make a shortage. There is a full stock of roofing paper stock. Bagging is a drug. There is little or no manilla rope remaining in this market, and while water is so low no demand for it.

Christmas business has produced an increased supply of wash papers, and common wash is a little hard to sell. The demand for shavings and better qualities of book stock is fair.

Quotations are as follows:

Domestic white rags	$2.00 to	$2.10	per 100
Blues and thirds....	1.15 to	1.25	"
Dark cottons	75 to	90	"
Roofing paper stock	45 to	50	"
Waste papers	35 to	45	"
Hard white shavings	2.00 to	2.10	"
Soft white shavings.	1.00 to	1.25	"
Book stock	75 to	90	"
Manilla rope	1.90 to	2.10	"
Mixed bagging	55 to	65	"
Sisal and jute string	75 to	1.00	"
Flax tow	1.10 to	1.25	"

CANADIAN MARKETS.

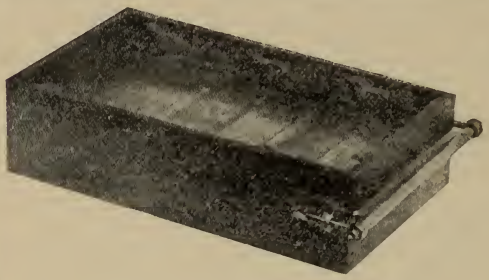
In the Canadian market there is little echanical pulp for sale outside of stand-g contracts. Such small sales as are ade are at $13.50 to $14, f.o.b. cars, and ese quotations are likely to increase. he low water in the rivers of Eastern anada is still the cause of much anxiety this trade, and even worse conditions revail in the Eastern States and in the ulp and paper district of Wisconsin. the level of Lake Winnibago continues fall the Fox river mills will be cut to per cent. of their normal supply of ater; and the Holyoke district of Mas-achusetts is also on short allowance. n the Andrascoggin and Pejibscot vers in Maine the mills will hardly be ble to finish out the month with their resent supply of pulp unless there is a reshet. Reference has been made else-here to the situation in Quebec, and we earn that the St. Lawrence channel self has been lowered owing to the low ater in all the tributaries draining the t. Lawrence valley. It should be re-nembered that the low water is not in ome cases—as, for instance, in Wisconsin—caused by the drought, but by the hard weather. The ice is unusually thick from the frequent spells of zero weather, the rivers in some instances being frozen almost to the bottom, and the springs and small feeder streams are largely closed up by frost.

Under these circumstances it is not surprising to learn that the International Paper Co. has gone abroad for a temporary supply of pulp to help out its paper mills, and that United States agents are still scouring through Quebec and the Maritime Provinces for wood. One agent has paid $8.50, f.o.b. cars, for rossed pulp wood, which is being shipped to Eastern States mills.

The situation is so critical in the news branch of the Canadian trade that publishers of daily papers are advised to cut down the size of their issues for a time. Some publishers in the States have had to get their paper mills to use sulphite with ground wood.

Sulphite is quoted at $1.95 to $2.10, delivered at mills in the United States, and may possibly go higher. In Canada quotations are nominally $1.80 to $2, but there is none for sale.

Plates Without Screws



The Blaisdell Screwless Screen Plate Holder

is placed before the Canadian mills as the first practical device on the market.

Fig 1.

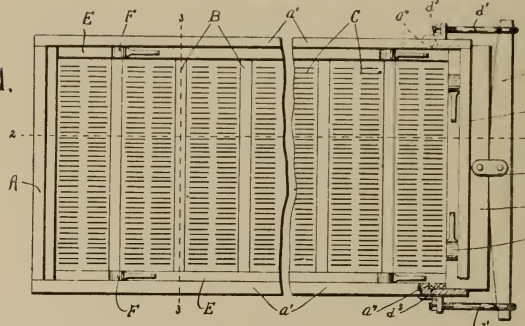


Fig. 2.

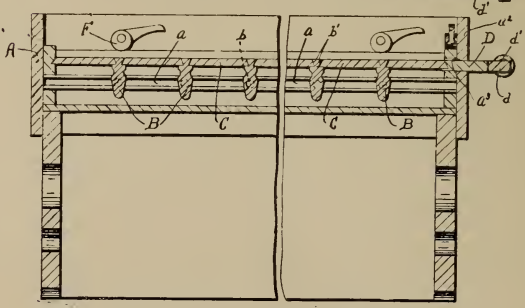


Fig. 3.

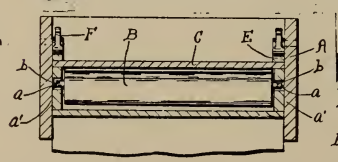


Fig. 4.

These plates are fixed with a clamping device and can be removed in a few seconds.

Made for all kinds of paper, from tissue to cardboard and will fit any diaphragm screen

The cradle is of bronze, and there is no iron inside the vat; and no wood under the plates to cause lumpy stock.

Patentees are open to negotiate for the Canadian rights.

ADDRESS

BLAISDELL SCREEN PLATE CO.,

Oakland, = = = Maine.

PULP AND PAPER MAGAZINE

MONTREAL AND TORONTO

Vol. 2. CONTENTS—FEBRUARY, 1904. No. 2.

INDEX TO ADVERTISEMENTS.

THE
PULP AND PAPER MAGAZINE OF CANADA

VOL. 2.—NO. 2. TORONTO, FEBRUARY, 1904. $1 A YEAR. SINGLE COPY 10c.

Pulp and Paper Magazine

A monthly magazine devoted to the interests of Canadian pulp and paper manufacturers and the paper trade, issued between the 10th and 15th of each month.

SUBSCRIPTIONS: Canada, Great Britain and the United States, $1 a year; to Foreign Countries, 5s. a year.

Changes of advertisements should be in the publishers hands not later than the 1st of the month, and, where proofs are required, four days earlier. Cuts should be sent to the Toronto office, by mail, not by express.

BIGGAR-SAMUEL, LIMITED,
PUBLISHERS
18 Court St., TORONTO. Fraser Bldg., MONTREAL.

PAPER FROM PEAT FIBRE.

That certain kinds of peat contain fibre which can be utilized for paper-making has been known for many years, and numerous attempts—some of them successful—have been made to bring this knowledge to practical and commercial issue in Europe. Of the several kinds of peat found in Canada the larger proportion is formed from the growth and decay of different mosses, Sphagnum and Hipnum moss being the two best known. The former is that from which paper fibre may be obtained as it is long and usually covers the decayed deposit to a depth of from one to two feet.

One of the largest sphagnum moss bogs in this vicinity is the "Welland bog," as it is known, although it lies some six or seven miles southwest of the town of that name. It covers an estimated area of 4,000 acres, or between six and seven square miles. The upper portion of the bog consists of fresh or growing moss, which in the course of propagation dies out at the roots as new growths advance above.

In 1899, experiments were made with this moss by Thos. Heys, chemist, of Toronto, and his reports were so encouraging that more extensive and practical tests were conducted at the mills of the Riordon Paper Co., at Merritton. A carload of the dry packed moss, which had been prepared as moss litter for the New York market, was sent to these mills where several experiments were made. The result proved that it is a very good "filler" for the coarser kinds of paper. In building paper a very good article was produced having as high as 80 per cent. and over of moss. The parties interested were so well satisfied with what had been done, that some paper-making machinery was installed during the following summer at the plant of the Canadian Peat Fuel Co., which controlled this bog, and considerable money was spent in further experiments.

It was found, however, that this moss

alone would not make a commercial article of paper by the processes in ordinary use, but that by the addition of some 20 per cent. of old paper, a good building paper or a low grade wrapping paper could be produced. In other words, it made a pretty fair "filler" for low grade papers. As the cost of a plant to produce such an article would run into a large sum, the experiments were followed no further.

Some two years later, a gentleman named Callender, from New York, tried a new process on this same moss and succeeded in producing a much better article. Experiments were carried on at the Taylor Bros.' Paper Mills, Don Valley, Toronto, and a pretty fair sample of wrapping paper was made having a large percentage of moss as filler.

It appeared that the fibre in the sphagnum moss, found in this deposit, is too soft and short grained to answer in making a valuable paper without the addition of some better fibre.

It was found that the moss on some of the Irish peat beds was much better in fibre and better adapted for paper making, so operations were transferred to that country where the writer understands a paper mill is now running on a commercial basis.

In the deserted hamlet of Celbridge, for some time past "the sole abode of jackdaws and rats," W. M. Callender started operations last year in an abandoned mill on the banks of the river Liffey. In this mill a turbine and a steam engine were put in, electric lights installed and machinery specially adapted to the preparation of the moss from the adjacent peat bed, known as the Bog of Allen. At present about 100 hands are employed in the mill and in digging and preparing material, but the company is so satisfied with the results that a plant five times the size of the present one, which was about 300-h.p., will be erected. The mill produces at present "ochre glazed" wrapping paper which is sold in the London market; but the company contemplates going into stationery and printing papers. It is stated that the wrapping paper now turned out can be sold on the market at a price which puts other wrappings out of competition. Sir Samuel Canning, of London, is financially interested in the company which is known as the Callender Paper Mfg. Co. The local Irish papers, which refer to the industry enthusiastically, do not give any details of the processes, except that the peat is boiled in chemicals in a cast iron tank holding a couple of tons, that it is then passed through beating engines and run into tanks, whence it is pumped to the machines.

In Germany and Holland the peat is found to contain excellent fibre and of such quality that cloth, hosiery and carpets have been made on a commercial scale for some years from yarn spun from it. Samples of this hosiery and several kinds of paper and board made from German peat fibre were recently on exhibition in Toronto.

During last summer some gentlemen having a process invented in Austria for making peat board, carried on experiments on a bog near Beaverton, Ont., and a company known as The Peat Boards Co., Limited, has been formed in Toronto to exploit this new enterprise. The writer understands that experiments have been successful so far as they have gone, but are not yet concluded.

It is to be hoped that success may attend the efforts which are being made

to utilize the large quantities of raw material found in this country in the shape of sphagnum moss. One deposit known as the Lucien muskeg, lying east of Winnipeg, is said to be sixty miles in length by several miles in breadth, and from five to ten feet in depth; while in the regions of north Ontario, lying about the Height of Land, towards James' Bay, there are hundreds of square miles of peat bogs many of them 15 to 20 ft. deep. There is here material not only for fuel, but for paper and textile fabrics sufficient to supply the world in the class of goods for which it is suited.

BRITISH PAPER TRADE WITH CANADA.

In last issue of this journal, a general answer was given to the question raised by a British contemporary as to why British paper trade with Canada was declining, while that of the United States with this country was increasing. Interviews of our representative with men in the trade confirm the opinion expressed last month that the burning of the Eddy mills could not be set down as a cause of the decline of British trade within the last three or four years, for the simple reason that the class of paper which the Eddy mills produced is made cheaper in this country than in Great Britain. In fact, Canada is actually exporting these papers to Great Britain in small quantities, which are likely to be increased in the near future.

In papers used in the stationery trade, especially those made from esparto, British makers are holding their own in the Canadian market, as they turn out an article with the velvety finish required by consumers; but in other lines, such as bond and registry papers, British makers have lost ground and their goods are steadily being displaced by those of Canadian make, as well as by those made in the United States. The reason is that Canadian and United States makers have undersold them. Mr. Cauldwell, of the Canada Paper Co., who has had an extended experience in selling papers, recalls the time English brands, such as Saunders' hand-made papers, were in sole possession of this market for ledgers, registry office books and other record papers. These papers were sold at $35 a ream of 72 lbs., and are still maintained at that price, but Canadian brands, such as Rolland's, are now selling at figures below that, and in qualities which appear to give as good service and last as long, while United States brands are also sold cheaper than British makes, and are, of course, replacing them. Pirie's papers used also to sell largely in Canada, especially in Manitoba and the West, but like Saunders' ceased to hold the market after about 1890. Note paper in pads and packages and envelopes in boxes formerly came in large quantities from Great Britain, but this branch also has dwindled to insignificance, partly, perhaps, because of the efficiency of machinery used in this country for the manufacture of envelopes.

It is the opinion of men best qualified to judge, that this trade has been lost chiefly from two causes, 1st, the failure of British manufacturers to adopt the best machinery and most modern methods, and second, failure to study the conditions of Canadian trade and the wants of Canadian customers. As an example of the latter, British exporters still insist on charging for cases, where for years such charges have been in almost all cases dropped by Canadian and

U.S. shippers, and where a charge is made it is only 50 cents per case against $1 per case charged by British shippers. These charges are not vital, but they are matters of that annoying kind that eventually turn a customer away, when combined with a difference on some more important point. If British firms had local agents who would keep their goods in stock so that customers could obtain them as quickly as from Canadian or United States mills, they would regain a great deal of lost trade, and would keep themselves in touch with the customs and requirements of consumers. British makers are at no disadvantage in regard to freight, because rates are often higher from Montreal to Toronto or from Montreal to Halifax than from English ports to Halifax; and if British firms shipped in the summer and kept stock in any of the leading cities of Canada, they would place themselves on a par with their United States competitors in the matter of freights. Over and above this they have the advantage in this market of 33 1-3 per cent. in duties under the preferential tariff, and in view of this advantage it seems strange that British manufacturers make no effort to recover the ground they have lost during the last twenty years.

QUEBEC GOVERNMENT'S PULP POLICY.

A very suggestive item appeared a few days ago in the Quebec correspondence of the Toronto Evening News. The writer states that the Quebec Government has under consideration the protection of the pulp industries and pulpwood of the province, and explains that "the Government, notwithstanding the clamorings of the manufacturers and those interested in pulpwood limits in the past, refused to protect the same by an imposition of an export duty. But the profits are so small, and at the same time, the quantity of pulpwood shipped to the American market is so very extensive, without return, that Premier Parent has come to recognize that the forests must not be denuded of their wood, without at least some return to the proprietary interests and also the interests of State. The pulp industry and its great possibilities in the province of Quebec is only in its infancy. No man engaged in its development can form any idea of its future nor prognosticate in the present, the intrinsic value that will be derived from its vast resources."

After expanding on the outlook for pulp and paper manufacturing in Canada, the correspondent goes on to say: "It is suggested by investors in the province of Quebec pulp industries that the Government should protect them from the rapacity of the American speculators, and even if the imposition of an export tax did result in their obtaining their wood from Oregon and the Western States, their action in this respect would be of short duration, for they would in the end have to come to Canada after they had exhausted their home supply, and while it would protect the Canadian investors, it would also eventually greatly benefit the Provincial Government in its ultimate gain in revenue They also advise, that while an export tax be imposed on all wood exported to the United States, a preference should be given the English market, and in so doing the Canadian pulp men could easily compete with the Scandinavian manufacturers. The representations made to the Quebec Government are so strong and

so rational, that it is thought the question will be discussed at the coming session of the Legislature with the result that the Government will yield to the popular demand."

Has the Premier of Quebec really come to appreciate the fact that his pulpwood policy means the selling of the people's birthright for a mess of pottage, or is he, like Reynard the Fox, going into the barnyard of the Eastern States paper manufacturers in the garb of a monk with the assurance that he has given up his old ways? If it is a case of serious conversion, it will mean the investment of millions of dollars in the pulp and paper industries of Quebec within the next few years with all the accompanying benefits to agricultural and other interests as the result of the enlarged employment of labor and capital within the province. Those interested in the future development of the province will watch with curiosity to see what follows when the Legislature meets.

WATER POWERS OF THE LAKE ST. JOHN COUNTRY.

Lake St. John has been described in a Quebec Government report as constituting the area or bottom of an immense amphitheatre, rising from it on all sides, with its exit towards the northeast in the depression formed by the Saguenay. From the shores of the lake the surface of the country rises by steps from one plateau to another in every direction, except towards the south, where the high lands are very near and attain a considerable elevation within a short distance of the water's edge. In a country having so varied a surface as this, it will readily be understood that the rivers are rapid and in the course of their descent from one plateau to another form a succession of magnificent falls. Many of these rivers are of enormous volume, and one of them, the Grand Peribonca, is 350 miles long. The rivers flowing into Lake St. John, according to an official report, drain a territory of about 20,000,000 acres, almost as much as the whole area of Maine, and considerably more than that of Nova Scotia or of New Brunswick, being double that of Denmark and of Holland, and nearly three times that of Belgium.

The extent of the water-powers in the Lake St. John country is not to be measured, however, by those formed by the rivers flowing into the great lake itself. Many others are to be found upon the upper Saguenay, the outlet of Lake St. John, and upon its various tributaries. Then there are also several splendid falls and rapids upon the many streams which drain the territory traversed by the Quebec and Lake St. John Railway between the city of Quebec and Lake St. John, finally discharging their waters into the St. Lawrence. Many of these, and very naturally those which are nearest to the line of railway, have already been utilized, so that at nearly every station along the line there are either sawmills, pulp factories, or industries of some kind.

Thus, St. Gabriel, seventeen miles from Quebec, is the scene of Heidretter's sawmill, with an annual capacity of eight million feet of lumber. At Lake St. Joseph are Harold Kennedy's mill, with a capacity of six million feet, and Julien's, which saws about two millions. Lake St. Joseph is twenty-three miles from Quebec. Five miles higher up the line is the Lake Sergent mill with a capacity of two million feet. The Bourg Louis mill, thirty miles from Quebec, turns out about 1,500 tons of pulp a year. Thirty-four miles from Quebec is St. Raymond, where there are several important industries, including a pulp factory with a capacity of six thousand tons a year, Bornais' sawmill with a capacity of three million feet, and one of Harold Kennedy's mills with a capa-

city of ten millions. Within the next six or eight miles, three other sawmills are reached, one at Cote's Crossing, having a capacity of four million feet, another at Rondeau River, with a capacity of two milions, and a third of the same size at Allen's Mills. Harold Kennedy operates two other mills in this vicinity, one having a capacity of four million feet at Lake Long, and another of seven millions at Perthuis, fifty miles from Quebec. At Riviere-a-Pierre, fifty-seven miles from Quebec, there are two sawmills, each of about two million feet capacity, operated respectively by Messrs. Leveille and Perron. Hon. Richard Turner operates sawmills at Pearl Lake, 101 miles from Quebec, and at Lake Edward, twelve miles distant from the first mentioned. The capacity of the first is about ten million feet, and of the Lake Edward mill, some eight millions. The headquarters of the logging operations of the Belgo-Canadian Company are at Lake Kiskisink, 135 miles from Quebec. This company cuts and gets out of the woods hereabouts, some 300,000 logs every winter. Lake Bouchette, 160 miles from Quebec, is the scene of Jalbert's sawmill, which is able to cut four million feet of lumber per annum. At Commissioners' Lake, 150 miles from Quebec, is Delisle's sawmill, with a capacity of two million feet. The Metabetchouan Pulp Company's new mill is expected to turn out 15,000 tons of pulp per annum, at St. Andre. Of a similar capacity are the new pulp mills at Ouiatchouan, 183 miles from Quebec, which have now been some time in operation. By far the largest sawmill in this part of the country is that of B. A. Scott, at Roberval, which has a capacity of fifteen million feet per annum. Mr. du Tremblay has also a mill at Roberval, with a capacity of four millions. On the banks of the Little Peribonca is the pulp mill of the Peribonca Pulp Company, having a capacity of nine thousand tons. On the Mistassini river is the sawmill of the Trappist Fathers, which can cut two million feet of lumber a year. Coming back to the railway and continuing along the Chicoutimi division, the eight-million-feet mill of Messrs. Price Brothers & Company is reached at Metabetchouan Harbor, five miles from Chambord Junction and 181 miles from Quebec. Mr. Tremblay's mill, at St Gedeon, 191 miles from Que-

Ouiatchouan Pulp Mills.

bec, has a capacity of three million feet of sawn lumber a year, while Kenogami, fourteen miles further, has a sawmill of two million feet capacity. At Jonquiere, 217 miles from Quebec and only ten from Chicoutimi, is the pulp mill of Price Bros. & Co., with a capacity of twelve thousand tons, while the Chicoutimi pulp mill, which is the principal industry in the city of that name, has a capacity of forty thousand tons per annum.

The water powers upon the great feeders of Lake St. John are practically inexhaustible. Taking only those within an easy radius of the lake itself, Mr. Langelier, a Government official, reports that over 650,000-h.p. could be obtained within a line drawn around Lake

Rivers.	Motive Power. Horse Power.
Great Peribonca	301,025
Little Peribonca	1,500
Mistassibi	75,000
Mistassini	60,000
Au Rat.	22,723
Assiemska	15,000
Chamouchouan	100,000
Au Saumon, aux Iroquois and Ouiatchouaniche	2,000
Ouiatchouan	33,000
Metabetchouan	2,500
Belle Riviere and Aulnaies	500
Little Dicharge	25,000
Grand Discharge	15,000
	653,248

Grand Discharge, Lake St. John.

St. John, within a dozen miles of it at the north, thirty to the northwest, fifty to the west, two to the south, and ten to the east. He points out that these water powers greatly exceed those of all the rivers in Sweden and Norway, where the pulp industry is carried on to so considerable an extent. The motive power which could be had from this small section of each of these rivers is given by him as follows:

Speaking of a very small section of one river he says: "Starting from the terminus of steam navigation on the Grand Peribonca, about fourteen miles from Lake St. John, and traversing a length of five or six miles in an ascending direction, this river hurls itself through a series of cascades or falls, piled, as it were, one above the other and which could easily develop an energy of 300,000-h.p." He then pro-

ceeds to enumerate them, commencing with the lowest, which is the Grand Falls, 21 feet high and 39,000-h.p. Then follow, in quick succession, Portage la Savanne Falls, 20 feet high and 36,500-h.p.; Bonhomme Falls, 20 feet high and 35,000-h.p.; Willie Falls, 20 feet high and 36,000-h.p.; Islet Falls, 10 feet high and 18,425-h.p.; Devil's Falls, 35 feet high and 61,500-h.p., and McLeod Falls, 40 feet high and 73,750-h.p., so that in the course of five or six miles of one river, this official estimates that over 300,000-h.p. may be developed. If the whole of the cataracts formed by the rivers flowing into Lake St. John were to be taken into consideration, the above figures might be almost indefinitely enlarged.

There is no lack of raw material for the mills that might be operated by a number of these powers. Out of nearly twenty millions of acres contained in the entire Lake St. John territory, only a little more than 500,000 acres are cleared and under cultivation. Most of the remainder is covered with forests. White, black and red spruce constitute more than 75 per cent. of the timber. Outside of that suitable for saw logs, Mr. Langelier estimates that there are over 97,000,000 cords of pulpwood in this region, taking only the product of the first cut, and calculating that with ordinary prudence, and protection of the smaller trees, spruce forests renew themselves in twenty years. The coniferous forests of the Lake St. John country exceed in extent those of Norway, are nearly equal to those of Prussia, and to half those of Sweden. Canadian pulp commands a higher price than the Scandinavian article, and if the requisite capital be devoted to it, there is enough wood and enough motive power in the Lake St. John country to keep half of Europe supplied with wood pulp.

Mistassini River.

NEW BLEACHING PROCESS.

It is claimed for the Vogelsang process that the period required for the bleaching of calicoes, yarns, lace and curtains can be reduced by nearly one-fourth by the electrical, as compared with the chloride of lime process. The electrolyser is also, it is said, suitable for bleaching wood pulp for papermaking, cotton-seed, waste flax, etc. Plant is to be erected at Nottingham to cope with the extensive trade in lace bleaching, and at Manchester a start is to be made with works capable of treating 25,000 pounds weight of goods a day.

MECHANICAL WOOD PULP.*

By Stanislas Gagne, B.A.Sc.

At a time when so much emphasis is laid upon Canadian industry and Canadian manufactures, when "Made in Canada" is used as a sign to catch the market of the world, a review of mechanical wood pulp, an industry which not only at present constitutes an important asset in Canadian wealth, but which promises to become almost a monopoly in the future, should be opportune and interesting.

It was the discovery of ground wood pulp as a paper making material in 1845 that first afforded an opening for the growth of this industry in Canada. Mechanical wood pulp is adapted to many other uses besides that of producing paper, but it is as a paper producer that its future is assured and it is chiefly in this connection that the process will be considered in this paper. Before entering into details, however, upon the process involved in the manufacture of mechanical wood pulp, a sketch of the essential components of paper and of the different materials employed in its manufacture will be given, that the efficacy and utility of the mechanical process may be judged by comparison. Typical paper consists of approximately pure cellulose so matted together as to form a sheet.

CELLULOSE.

Cellulose may be termed the material basis for the vegetable world. It is a white, translucent, tasteless, odorless substance without nutritive power, insoluble in water, alcohol and oils, and a little denser than water. For paper making purposes, cellulose fibres are derived from two main sets of sources, in the first place, from cotton and linen rags, esparto, flax (spinner's waste), hemp (old rope), jute, straw and sugar cane; and secondly, from different kinds of wood. In all the fibres derived from these sources the following properties are requisite; they must have a certain length, they must be small in breadth or thickness, they must be flexible and felt well. The felting power depends specially on the structure of the individual fibre. An example of a good felting fibre is the wool (not a paper making fibre, being of animal nature). As seen in figure 1, the wool fibre is discontinuous, consisting apparently of imbricated scales; these brought together tend to interlock, whereas silk fibres (also of animal nature), for example, being dual cylinders perfectly smooth, simply slide over one another when rubbed or pressed together. We shall now take a short glance at some of the commonest sources of cellulose fibres as enumerated above, and see in what degree they possess these different properties.

COTTON.

Cotton fibres are the purest cellulose available in a natural state. They are long, thin, and rather rough, and when dry tend to roll themselves around their axis, hence they felt well. Figure 2 shows the form and structure of a cotton fibre. These fibres, which usually reach the paper-maker in the form of rags and waste, form the basis of most high grade book papers, and also enter, in different degrees, into the composition of nearly all grades.

FLAX.

The fibres of the flax are long, strong and flexible; they are often jointed and cut up, and are capable of lengthening without breaking. They are used by the paper-makers also in the form of rags and spinners' waste, and produce a very strong paper, (linen paper), which, however, is not so compact as that manufactured from cotton. See figure 3.

HEMP.

Hemp fibres resemble very much those of flax, but are coarser and stronger; especially is the pure fibre of Manila hemp which constitutes the basis of the real Manila paper. These fibres usually reach the paper mill in the form of old ropes and rags.

*The above paper won the first prize given by Biggar-Samuel, Ltd,, for the best student's paper presented to the Canadian Society of Civil Engineers for 1903,

STRAW.

The fibres of the straw are little adapted to paper making, but the cheapness of this raw material in such countries as our great west renders its use economical. Straw fibres are of several shapes, some being long and slender and fairly uniform, while some are in the form of smooth pith cells, and of serrated epidermal cells. See figure 4.

SUGAR CANE.

Cane thrash or bagasse has been recognized as a good raw material for rough paper as its fibres possess great strength. It has been claimed that it is stronger than Manila hemp, but its value for book paper has yet to be demonstrated. As straw it is a very cheap by-product in southern countries.

Fig. 1
Wool Fibre

Fig 2
Cotton Fibre

Fig. 3 — Flax Fibres
a shows creasings from bending

WOOD.

Most of the above-mentioned sources of cellulose are available only in comparatively small quantities, and as such the paper-makers use them merely to get special grades of paper. On the other hand the great bulk of our manufactured paper is derived from wood. Roughly speaking, wood may be said to be composed of cellulose fibres cemented together. These bundles of cellulose fibres are in the form of long cells which are usually parallel to the longitudinal axis of the tree which cells are also cemented together. See figure 5. The general chemical composition of wood is 50 per cent. carbon, 6 per cent. hydrogen, and 44 per cent. oxygen. Taking poplar and pine as typical examples their physical composition is as follows:

	Pine	Poplar
Percent of cellulose	53.3	62.8
" " resin	2.0	1.3
" " aqueous ext.	1.2	2.9
" " water	14.5	12.1
" " lignin	30.0	20.9

These quantities vary with different qualities, especially in the case of pine. The following is the percentage of cellulose for different woods:

Poplar	62.8
Silver fir	56.9
Willow	55.7
Birch	55.5
Pine	53.3
Spruce	53.0
Chestnut.	52.6
Beech	45.5
Ebony	30.0

The fitness of these different kinds of wood as pulp producers depends somewhat more on other properties than on their percentage of cellulose, as will be seen later. Nearly all our Canadian species of wood may be employed for pulp making, but in actual practice the number of kinds is limited; hence we shall consider only those used in our Canadian pulp mills, and more especially those employed by mechanical wood pulp manufacturers, namely, birch, bass-

wood, poplar or aspen, hemlock, pine, fir or balsam and spruce.

Birch.—The fibres of the birch are white, long, and in breadth or thickness vary in different parts of the same fibre; they are, as a rule, pointed and exhibit numerous markings in the form of slits. See figure 6. Only a limited quantity of it is used in Canada, and mostly all by chemical process. It makes a fine grade of paper.

Basswood.—The fibres of the basswood are very similar to those of the birch. They are employed more than birch as a paper producer, and give a fine grade of paper, strong and soft.

Poplar or aspen.—The fibres of the poplar and aspen are among the best wood fibres for paper making. They are white, long, thin and pliable, and resemble closely, in appearance, the birch fibres; some show joints and extend in the form of a rail, see figure 7, but they are used for fine book paper as they are capable of acquiring a fine gloss. They are pulped extensively where a large supply is available, but the difficulty in securing sound wood renders the operation sometimes rather expensive. Poplar and aspen apparently sound to the eye are very frequently, through certain districts, discolored and rotten at the heart. This "black heart" must be removed, as its presence renders the pulp very inferior in quality in proportion to the quantity of the discolored and rotten part.

Hemlock.—The hemlock furnishes a coarse and rather brittle fibre of dark color, and suitable only for cheap paper. Generally speaking, it is used only where the supply of other woods becomes short.

Pine.—Pine fibres are brown in color, long, flat and broad, their ends are tapered and are characterized by oblong openings which penetrate through them. This wood is used but in few places, and pulped by chemical process. It produces a brown paper specially well adapted for boxes for sugar confections.

Fir and balsam.—The fibres of the fir or balsam resemble those of the spruce described below, and are, like it, white, long, thin, and strong. As found in different parts of Canada, this species contains varying quantities of resin, a fact of much consequence in its value as a pulp producer. Where it contains little resin it ranks near spruce as a raw material, but where resin is present in large quantities, it is detested by the manufacturers. In the chemical process much difficulty is experienced in removing the resin, and in the mechanical process no end of trouble is occasioned by the resin in the various parts of the machinery. Where little resin exists, as much as 25 to 40 per cent of fir or balsam is used with spruce, and when largely resinous, 5 to 10 per cent. is considered plenty, and none at all much better.

Spruce.—The physical composition of spruce, as given at the beginning of the

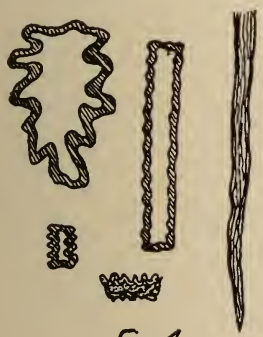


Fig. 4
Straw fibres & cells

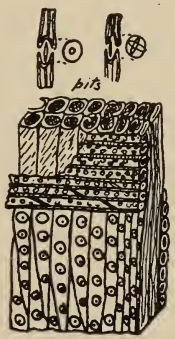


Fig. 5—Spruce Structure

Fig. 6
Birch Fibre

article on wood, shows that it contains 53 per cent. of cellulose fibres, its other constituents resembling those of pine. Its fibres are white, long (from 1-20 to 1-5 of an inch), thin (from 1-500 to 1-2000 of an inch), broad and flat, rough, strong and often twisted. They are characterized by the presence of numerous pitted cells or cups, circular and elliptical; see figures 5, 8 and 9. In Canada we have mainly three kinds of spruce; the black, the white, and the red or grey; these colors refer chiefly to the bark and not necessarily to the wood fibre. The black variety is that which stands in most favor with all pulp manufacturers. Its fibres are the tough-

Fig. 7
Poplar Fibres

Fig 8
Spruce Fibres

Fig. 9
Ground Spruce

est of the three varieties and are fine and white. It grows very thickly in swampy regions such as the Laurentian areas where it is easily recognized by its dark bark and long stem, with only a bunch of leaves at the top. The white variety grows specially on dry ground and its fibre is a little weaker than that of black spruce, but somewhat whiter. It also makes a fine grade of pulp. The name grey spruce refers to the color of the bark, and red spruce to the color of the wood. The fibres of red spruce resemble those of the white variety, but have a pinkish color. These three varieties of spruce form the basis of the wood pulp industry of Canada, and in the majority of the mills spruce is employed exclusively, especially for mechanical pulp. They furnish the best wood fibres for paper making, and our immense available supply renders them a most economical raw material. It may be added that trees of slower growth produce the longest and toughest fibres; for example, spruce grown on poor soil or in rocky places, or again in cool climate give better fibres than that grown in richer soil and warmer climate. For these reasons, spruce grown in Newfoundland or near the Labrador Coast gives a better grade of pulp than that grown farther inland and south. For climatic reasons also, Canadian spruce furnishes better pulp than that grown on the soil of our southern neighbors.

PROCESSES.

The following is an outline of some of the different processes for obtaining fibrous material or pulp from the above mentioned sources. In all processes, except perhaps the mechanical, the direct aim is to obtain the cellulose fibres pure and individual. Cotton, flax, and hemp are used, as said before, in the form of rags or waste which are first boiled to cleanse them, then beaten to separate the fibres and bleached. Straw and bagasse are treated by chemical process suited to their composition; they are

not pulped in Canada. Wood is treated by two different processes, namely, the chemical and the mechanical. In Canada we have mainly two distinct chemical processes; the alkaline or soda process, and the acid or sulphite process. The action of the chemicals in both cases is to dissolve the non-cellulose constituents or the cementing material of the wood, thus leaving the individual fibres.

Soda process.—Twenty-five years ago the soda process was considered the most economical of the different chemical processes. It was first developed in America in 1853 by Watt and Burgess; and in 1867, by Angus, Logan & Co., of Windsor, Que., who made soda pulp out of basswood. In this process the wood is first barked and chipped, then packed in digesters which usually consist of cylindrical steel or iron tubes capable of containing 2 to 3 cords of wood; a nine to ten per cent. solution of sodium hydrate is put in and the whole is raised to a high temperature and pressure by admission of live steam. This "cooking" lasts from 8 to 10 hours, after which the pressure is partly taken off, sufficient only being retained to blow the mixture out in tanks, which is immediately done. This mixture of a brown black color is washed with hot water, and the diluted liquor is conveyed to tanks and washers where the soda is mostly recovered in the form of ash. The pulp then consists of the individual fibre of the wood employed, but colored light brown by the digesting liquor; it is afterwards screened and bleached, preparatory to its being transformed into paper.

All the woods mentioned and described above are or may be treated by this process, but poplar and aspen are the best adapted to it, and in fact they are nearly always pulped thus. This is also a good method for pulping birch and basswood, but spruce, fir and pine are more difficult to treat. Woods are never mixed in the same charge of a digester. The yield of air dried fibres is from 30 to 35 per cent. of the wood employed which shows that from 1-3 to 1-2 of the cellulose has been destroyed.

Sulphite process.—The sulphite process is comparatively new, and has several advantages over the soda process which caused most of the mills built lately to adopt it. The advantages are these: the cost of chemicals is less, a larger yield of pulp is obtained, the fibre is not weakened by the process, and the paper made from it is harder and more transparent. In this process the wood is barked and chipped as in the soda process; some manufacturers remove the knots and other impurities which are but little acted upon by the chemicals, while others claim that it is more economical to remove them afterwards in the screens. The chips are dumped into the digester which is an iron clad cylinder, vertical or horizontal, or perhaps also rotary, lined with some material not acted upon by the acid; in the past lead was employed for this purpose, but in later practice, a layer of 4 or 5 inches of portland cement has been found to work well. In a digester of a capacity of 2 cords, 2,500 gallons of a 3½ per cent. solution of an acid sulphite is put in and live steam is turned in thus raising the temperature and pressure. The constitution of the wood tends itself to the formation of certain organic sulphur acid (sulphonates), which greatly facilitate the process. After 10 to 12 hours of "working" the pulp is blown out into tanks where it is washed; the liquor in this case, however, being usually dumped into the nearest stream, the gases only being preserved. In this case also the pulp consists of the individual fibres, which, after being washed, screened and bleached, are ready for the paper machines. As in the case of the soda process all the woods above described may be "pulped" by this method, but spruce is the best adapted and the most employed. The yield by this process is usually from 40 to 50 per cent. of the wood employed, which is quite an excess over that of the soda process. There are many other so-called chemical processes for isolat-

ing cellulose from wood, but as they are not used in Canada, and not likely to be for some time at least, they are of little importance to us.

THE MECHANICAL PROCESS.—In the mechanical process the wood is first cut into 1½ to 2 feet lengths and barked. These blocks are then pressed against revolving sandstones which grind the wood to a pulp. This, again, after being screened and bleached is ready for the paper machines, but as our mechanical pulp is nearly all made for exportation, it has to be transformed into a convenient shape for shipment. For this reason, the mechanical process as usually understood also means the use of "wet machines" to put the pulp into the form of sheets, and also of hydraulic presses to extract the water from these sheets, and of packing presses to put them into proper shape for shipment. The above description of materials and processes has been given to convey a full understanding of the aim and object of pulp making, and to furnish a basis of comparison. We shall now turn our attention to a fuller description of the mechanical process, which is the main object of this paper.

(To be continued).

Forestry and Pulpwood

The Cape Breton County Council is being urged to adopt rules for the prevention of forest fires, in their county.

The attitude of the Board of the United States General Appraisers toward pulpwood from the Province of New Brunswick, Canada, has been clearly defined by Judge Somerville, who has just handed down a decision that no countervailing duty should be levied on pulpwood coming from that province. Nova Scotia wood is also free of duty, and the countervailing duty is levied against Quebec only.

The fifth annual meeting of the Canadian Forestry Association will be held in Toronto on March 10th and 11th. The programme is now being arranged and will be announced by circular to members. The papers already promised include: The Systems of Administration of Timber Lands in Canada, by Aubrey White, assistant Commissioner of Crown Lands for Ontario The Laurentides National Park, by W. C. J. Hall, Department of Lands and Forests, Quebec; Forestry in Relation to Irrigation, by J. S. Dennis, irrigation commissioner for the Canadian Pacific Railway Company; Forest Reproduction in Germany, by A. Harold Unwin, of the Dominion forestry branch. Other aspects of forestry in relation to lumbering, agriculture and education will be dealt with. The railway companies have granted a single fare rate to those attending the meeting.

A deputation consisting of J. B. Whitman, of Round Hill; Frank Davison, of Bridgewater; Frank Lowe, of Aylesford; T. M. McGrath, of Tusket; F. C. Whitman, of Annapolis; M. McDonald, of Truro, and J. H. Gillis, of Halifax, waited recently on the Attorney-General of Nova Scotia, and presented a draft bill amending the statute which deals with the prevention of forest fires. Their proposed legislation includes the appointment of a chief ranger for the province, and eighteen county rangers, who shall be under the jurisdiction of the chief ranger, with the power of appointment and dismissal. These officials are to be invested with large general powers as in Quebec and Ontario. The county rangers are to patrol their districts during the season of danger and obtain all help necessary to suppress fires. The provisions are very stringent against settlers, hunters, fishermen, sportsmen or others setting fires during the summer season. The Attorney-General was prepared to recommend that the chief ranger be paid by the Government, and that the lumbermen and municipalities pay the county rangers, and whoever they may employ. Hon. Senator Power questioned the wisdom of allowing the chief ranger to make the appointments, and stated that in Ontario the forestry provisions left the appointment of the forest rangers in the hands of the lum-

bermen, thus avoiding any danger of political influence being used. In Quebec the Government appointed forest rangers on the recommendation of the lumbermen. The Attorney-General announced that the Canadian Forestry Association would meet at Halifax during the present session to direct public attention to the necessity of adopting a general policy with reference to forest preservation and reforestation.

Before the Quebec Colonization Commission at Hull on February 11th, J. R. Booth gave some interesting testimony on the subject of forest preservation. In the course of his evidence, Mr. Booth stated that the approximate area of the limits controlled by him in the province of Quebec was about 2,400 miles, and that the part of this area affected by settlement was fifteen or twenty per cent. He had trouble only on one occasion with a settler and that on the Coulonge river. The man had got too far into a pinery, and as there was danger of a fire, he bought him out. Mr. Booth said he spent about $700,000 a year in cutting and taking out logs in the province of Quebec. About sixty per cent. of this amount was expended for provisions, teams and the like. He generally employed settlers, as they were found to be good steady workers, and much more reliable than men brought from a distance. He had suffered tremendously from fires caused sometimes by the neglect of his own men, sometimes of settlers, hunters, mine prospectors, and others. He, as well as other lumbermen, had no objection to settlers, but on the contrary liked to have them, as they were of great help. He thought there was always a danger of fire when settlers took lots in the centre of a limit, and that the remedy was to group them together in parts where not less than 50 per cent. was arable land. The preservation of the forests lay entirely with the Government. He thought that if the regulations in Quebec were the same as in Ontario a great deal of the present trouble would be got rid of. It cost more money in every way to get out timber in the province of Quebec than in Ontario, and the security against fire was not as good as in the latter province. In his experience he thought that fire had destroyed about twice as much timber as had been cut. He cut between 40 and 50 millions of feet a year. Mr. Booth then went into an extended explanation of the wealth of Canada's timber resources and urged that the Government enforce regulations that would protect its forests. There is no use in talking of reforesting when we don't protect those we have. Mr. Booth was heartily thanked by the Board for his excellent explanations.

Mill Matters

During the recent thaw at St. Catharines, Ont., the rush of ice and water, which poured down Twelve Mile Creek, overflowed the banks, ran on to the canal and into the Kinleith paper mills, flooding the storehouse. A large force of men with teams were required to remove the soluble chemicals kept there, to a place of safety. Prompt action prevented any damage.

The Imperial Paper Mills of Canada, Limited, Sturgeon Falls, Ont., are applying to the District Court of Nipissing for an order authorizing them to increase the height of the dam in the Easterly Channel at Sturgeon Falls, to a height sufficient to give a thirty-eight foot head of water for the purpose of supplying additional power to the mills, and to acquire the necessary properties.

Mr. Caron, M.P.P., for L'Islet; Mr. Martineau, and several others representing the Metabet-Chown Pulp Company, waited upon the Prime Minister on February 4th to request payment of the subsidy upon thirteen miles of a spur line connecting the company's works with the Lake St. John Railway. The subsidy was authorized last session, but the contention of the Railway Department is that it has not been earned. Sir Wilfrid promised that the matter would be looked into.

The Laurentide Paper Co., Limited, has declared a dividend of four per cent. for the last half-year.

The extreme cold weather, at Sturgeon Falls, Ont., has lowered the water to such an extent that the power of the Imperial Paper Mills is considerably reduced at the mills, and their production has been hampered in consequence.

The Royal Paper Mills Company is applying to the Quebec Legislature for an Act to substitute bonds of $1,000 each for the existing bonds of $100, with the consent of the present bondholders, and to provide additional security to the holders thereof.

The contract for the new paper mill of the Cornwall Paper Manufacturing Co., to be erected near the station, at Mille Roches, Ont., has been let to Williams & Fallon, of Cornwall. It is anticipated that there will be little, if any, delay in completing the work.

J. M. McKinnon, manager of the Oriental Power and Pulp Company, Vancouver, states that his company has commenced work on their Swanson Bay property in preparation for the pulp and paper mills. Wharves and buildings for housing purposes are being erected. It will take about eighteen months to complete the plant. The wharves are about finished, and are capable of accommodating the largest vessels at the lowest tide. When the plant is completed the company will employ three hundred men. Swanson Bay is opposite Princess Royal Island, and the location for the mills is described as ideal in respect to shipping facilities, water-power and timber limits. The mills will be operated by a fall of water from a lake seven miles long, giving 30,000-h.p., on a head of 371 feet. Ultimately the mills will have a capacity for a daily production of 100 tons of news print, but at present machinery will be installed for half that amount. A market for all has already been found in Australia, Japan and China, and the company is now negotiating with the C.P.R. Company for the handling of the product. In addition to what is shipped abroad, it is hoped to supply the local provincial demand, which is put down at 1,500 tons a year. The Canadian Finance Syndicate, of London, will be the directors of the concern.

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Pulp & Paper Currency

A good market would appear to be open to Canadian pulp and paper mills in India, especially in news. F. M. Coleman, manager of the Times of India, is authority for the statement that no Indian mill can make news cheaply enough, and consumers have to look to outside sources largely for their supplies. Mills established in British Columbia should be able to handle this trade to advantage in connection with exports to Australasia and Japan, though eastern Canadian mills could no doubt ship via England if not by direct boat from Quebec or Maritime Province ports. The subject is worth enquiring into.

An article in Bradstreet's predicts, on the authority of a New England lumberman or paper man, that within six years at the present rate of consumption there will be a famine of spruce and pulp in the United States. The total cut of spruce in the States last year is placed by this authority at 1,200,000,000 feet, of which 800,000,000 went into pulp and the balance to the saws. The International Paper Co. alone uses 200,000,000 feet, and the Sunday edition of one of the large newspapers is said to require the shipping of an acre of spruce for each number. If one issue of a Sunday newspaper sweeps bare a whole acre of spruce, the record of the total must have ominous significance, and moralists may naturally speculate on the curse of barrenness that will follow the devolution of the Sunday newspaper—using that term in its proper sense of rolling downward. The Sunday paper is fast proving itself to be an avalanche that is not only sweeping away the sheltering forests, but that more august shelter to the moral and spiritual life of the people, a consecrated day of rest.

In a speech delivered this month in Montreal Sir Wilfrid Laurier made the

following reference to the paper trade: "Let us take the paper which is used in newspaper. This paper in the United States pays a duty of 35 per cent. In Canada it pays only 15 per cent. It was complained that there was a combine to keep up the price; we made an enquiry, and, according to the proof, these complaints were well founded, and we reduced the tariff by 10 per cent. We had a tariff of 25 per cent.; we have reduced it to 15 per cent., and since that time those who talk of high protection have not tried in the least to increase that tariff. They buy paper from the Canadian manufacturers, and we have put an end to the unwarranted gains made by manufacturers of paper. But, gentlemen, here is what happens. High tariffs produce combines, produce trusts, and that would take place if we were to copy the American tariff; the Canadian consumers would come to us to ask for protection against protection." If Sir Wilfrid Laurier chose to "make an enquiry" into the relations of other Canadian manufacturers with foreign manufacturers in the same lines, we could name a dozen industries in investigating which the same thing could be proved. Unfortunately for these other industries the press is not united against them, as it was in the case of an industry whose price lists affected their own profits. And so the high ground taken by Sir Wilfrid in the case of Canadian paper manufacturers is only reached where a power like the press forces him into action. Of course, it is a good "talking point," as the commercial traveller would say, and it is current politics to claim for principle what is due to expediency.

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THE CUSHING SULPHITE FIBRE CO. vs. GEO. S. CUSHING.

At the January sitting of the Equity Court, St. John, N.B., Judge Barker delivered judgment in the above case, of which the following is a synopsis: The plaintiffs' claim was on four grounds; that while defendant was the company's managing-director, he had made secret profits which should be restored to the plaintiffs; that he had carried on dealings to the detriment of the company, and to his own advantage, reparation for which should be made; that he was negligent in his duties, and the company incurred losses thereby, for which he should be held liable; and that he had taken payment for more lumber than he supplied to the company at excessive prices, which excess should be accounted for.

The judge found that the defendant's dealings had been carried on with the knowledge of his co-directors, therefore the first claims could not be sustained. No attempt having been made to sustain the second claim, the charges were practically abandoned. The real controversy arose from the third and fourth grounds the facts relating to them being as follows:

The defendant owned a lumber mill at Union Point, just outside of St. John, N.B., and believing that a pulp mill could be profitably operated adjacent to his mill, utilizing the slab-wood for pulpwood and fuel, he organized the plaintiff company in 1898. One-third of the capital was taken up by the defendant and others in New Brunswick, the balance being subscribed for by Captain Partington, an Englishman having a long experience in pulp manufacture, and his friends. The pulp mill commenced operations in 1900, and had been running ever since, Captain Partington being president of the company. Defendant, who was a director, in 1899, was appointed managing director and held that position until 1901. The actual cost of the mill and plant greatly exceeded the expert's estimates, which had been examined by Captain Partington and which his knowledge of the industry should have enabled him to verify before taking stock in the company. Captain Partington blamed defendant for this increased cost, notwithstanding that during this period labor and materials had greatly increased in price, the Captain himself putting the advance in machin-

ery at 50 per cent. Moreover, the men selected by Captain Partington and sent from England to superintend the construction, and who acted without interference from the defendant, were responsible for a material increase.

In the ten months defendant was managing director, after the mill was running, he supplied wood for pulp and for fuel at invoiced prices aggregating $62,980.87, on account of which acting by himself as managing director, he received $52,391.30, leaving a balance of $10,589.57, which was disputed on the ground that the invoiced prices were incorrect. These prices were intended to be equal to two dollars per thousand of mill cut. The evidence, however, showed that the prices were subject to revision under an agreement by which they were to be governed by the cost of round wood for pulp, and coal for fuel, the relative cost having to be determined by a practical test which, however, was never made. The substantial dispute arose on this question.

The plaintiffs claimed $40,000, being $10,000 the cost of a fuel house alleged to have been built without authority, and $30,000, overcharges on wood delivered, the contention being that the defendant occupying a fiduciary position had illegally taken from the funds of the company $40,000, which should be restored. This would leave a large balance due to the plaintiffs after deducting the $10,589.57. The evidence did not sustain the plaintiffs' contention as to the quantity of wood delivered, no such thing had been suggested until the suit was commenced, although invoices, open to the officers of the company, were regularly delivered. As to the claim of $10,000 for the fuel house, although Captain Partington gave no specific instruction for its erection, and knew nothing about it till after its completion, his representative must have known all about it, as did the other directors, and no objection to it was made until this action was commenced. If Captain Partington's authority was required, which was not clear, there was ample evidence of an implied authority for the purpose.

The authority delegated to Captain Partington, which was perhaps no more than that of any person holding voting power to elect a board of his own choosing, was more important in view of the company seeking to fix the liability on the defendant. The proposition that the directors had in effect effaced themselves and given sole control to Captain Partington could not be accepted, nor could the doctrine that defendant was managing director with nothing to manage.

The contention made in the evidence was that the cost of the fuel house and machinery for conveying wood from the sawmill to the pulp mill must be charged to the defendant, because it had been built without Captain Partington's authority, and because both had become useless by the abandonment of the mill wood for pulp and fuel, which was an experiment made at defendant's risk. If more successful for pulp and fuel than round wood and coal, well and good, but if otherwise, the cost, including the two charges mentioned, was to fall on defendant's shoulders. It was also said that the expenditure was unreasonable, and made to advance the defendant's private interest. It was remarkable that while the plaintiffs' bill charged defendant with a great number of fraudulent dealings, it contained no mention of this contention. The use of mill wood from defendant's mill was contemplated when the mill was built and the plans of machinery were changed so that half round wood and half slab wood could be used, the supply of the latter being inadequate. It could not be wholly claimed that the fuel house and machinery were a loss, because those managing the company's affairs did not choose to use them, but if it were so, in view of the evidence, the defendant could not be found guilty of that negligence necessary to render him liable for it. It might be that a less expensive plant would have done, but that at most was an error of judgment for which he could not be held liable, therefore the claim for loss on that account could not be sustained. Dealing with the wood invoiced by defendant,

the question was: Did any agreement exist, and if so what was it? Defendant's position had been consistent throughout, he having contended that although the prices for slabwood were reasonable, they were subject to revision on the basis of its relative value to round wood and coal. Captain Partington's position was not always so well defined. Defendant had always stated that the charges were not final. It was to be inferred from the correspondence between all parties that Captain Partington agreed that if mill wood could be used for pulp and fuel at a price making the cost of production no more than round wood and coal, assuming the quality to be equal, that defendant should be paid for it on that basis. Captain Partington's experience led him to prefer round wood and coal, but there was no reason to suppose that either he or defendant had any intention of arranging for a wood supply detrimental to the shareholders, and to defendant's benefit. The plaintiffs contended that the basis referred to applied only to wood supplied between October 10, 1900, and March 20, 1901; and that from March to June 25, 1901, the charge was to be at the rate netted by defendant before the pulp mill was built, or, if not that, at whatever the wood was worth to plaintiffs for their business. The parties also agreed that from June to August 10, 1901, when defendant stopped supplying wood, the price was to be the same as for the period from October, 1900, to March, 1901, so that they differed only in regard to how the value of the wood supplied from March, to June, 1901, was to be determined.

Mr. Powell, for the plaintiffs, admitted that in dealing with this period there were practical difficulties, and suggested that all three periods be treated alike; therefore, his suggestion would be adopted. The question then arose, How was this relative value to be determined? One way was by comparison of the actual costs of production for fixed periods, when round wood and coal and mill wood were being used respectively. The other was by the actual experience of practical men, who, to quote Captain Partington, spoke "of facts, not theories." It was obvious that conditions varied, and so many things rested on mere estimates or opinions as to which experts disagreed that the results, though pointing in the right direction, were only approximate. The figures submitted gave the expenditure during six different periods, the first three including the time when defendant was managing director, and the other three portions of time between August, 1901, and July, 1902. It was well known that in the early life of a manufactory like this mill mishaps occurred. The machinery was new, the workmen were unskilled and without experience. Such was at all events the case with this mill. Nothing went smoothly except the engine. The digesters were constantly giving trouble; the linings in them blew out on several occasions, causing great delay and expense. There was no end of trouble with the acid plant, and the screens and barkers required changing in many ways before they worked satisfactorily. All such stoppages very seriously increased the cost of production. Messrs. Cushing, Ellis, Waring, Cudlip and others spoke of this increased cost.

The evidence showed that the mill worked only 89 days out of the 123 working days between October 8, 1900, and February 28, 1901. From February 28, 1901, to March 28, 1901, she worked the full 27 days, and from March 28, 1901, to August 10, 113 days, she worked 100. From September 13, 1901, to January 17, 1902, 109 working days, she worked 108; so that during the first three periods which comprise the time previous to the defendant's resignation on the 10th of August, 1901, 47 working days were lost out of 263, while but one day was lost out of the 109 days which made up the two other following periods. During the first three periods, 263 working days, the mill produced 4,063 gross tons of pulp, or at the rate of 15½ per day, while for the other periods she produced 2,193 gross tons, or at the rate of 20 tons per day, a difference of 4½ tons per day, attri-

buted mainly to the stoppages. It was suggested that these stoppages were due to some extent at least to the use of millwood or a want of proper management on the defendant's part. It was due to him to say that this suggestion was not in any way supported by the evidence.

Mr. Ellis, who had sole management of the mill for eight months while defendant was managing director, had said that the difficulties were due to defects in construction, and not in any way to the use of millwood for making pulp. Between the third and fourth periods, a month (from August 10th to September 13th) elapsed, during which the mill was shut down and certain repairs made. The cost of wood, coal and wages for the third period was $39,758.44, and the production was 2,159 and 729—2,240 tons of air-dry pulp making the cost per ton to be $18.48, while the cost of wood, coal and wages for the next or fourth period was $17,025.09, and the production 933 and 1,361—2,240 tons of air-dry pulp, making the cost per ton to be $18.24, or a difference of 24 cents per ton in favor of the fourth period.

If these elaborate comparisons were to be relied on, what two periods could be more suitable for the purpose than these two. As an offset to the difference in cost, the mill stopped 13 days out of 113 working days in the third period, while in the fourth there were no stoppages. In the third period they used for pulp-making round wood and millwood in about the proportion of three-quarters mill and one-quarter round, and for fuel, millwood and coal in about the proportion in cost of two-fifths of wood and one-fifth of coal. In the fourth period they used only coal for fuel and round wood for pulp. A further analysis showed that while the cost of fuel per ton of air-dry pulp in the third period was 62 cents in excess of that in the fourth, and the cost of wages was 68 cents per ton in excess of those in the third period, the cost of wood pulp per ton is $1.04 less in the third period than in the fourth.

They had the opinions of two practical pulp makers as to the relative cost and value of these two kinds of wood and fuel. Mr. Mooney, manager of the Mispec mill, stated that he had visited the mills at Bangor and other places, and also the plaintiff's mill, and that the slabs supplied seemed of about the same quality as those used at Bangor. Also, that in 1901 he made a contract with the defendant for slabwood delivered in St. John at $3.50 per cord, which would cost $4.20 per cord at Mispec.

He was asked:

Q. Suppose your sulphite mill had been situated in 1900 and 1901 the same as the Cushing sulphite mill is situated relatively to the Cushing mill, so that the mill wood would be delivered in the same way, what do you say it would be worth per cord for making pulp?

A. I think no doubt it should be worth $3.50 per cord.

Q. You say in 1901 it would be worth $3.50 a cord?

A. Yes.

He also says in 1901, according to the average price of round logs, it would pay to use millwood at $3.50 a cord.

Mr. Clark, who had several years' experience at Bangor and elsewhere, stated that they bought from the defendant in 1901 for their mill at Bangor several hundred cords of slabwood at $5 per cord, delivered at Bangor. This Bangor mill was operated under conditions almost identical with those at St. John. They used large quantities of millwood for making pulp and for fuel. It was obtained from a sawmill within a few hundred feet from it, as at St. John. Since 1899 they had been paying $5 a cord for pulp wood and $1.50 for fuel wood. He gave it as his opinion that slabs were far superior to round wood for making pulp, and stated his reasons for thinking so. His evidence was as follows:

Q. From your experience, Mr. Clark, what do you say as to the relative merits of slabwood and round wood for making pulp?

A. Slabwood is superior in every way.

Q. So you say from slabwood you can make better pulp in every way than from round wood.

A. Oh, yes.

Q. From your experience, Mr. Clark, you pay $5 a cord, you say, for slabwood; now, what would you value round wood at relatively to that, taking $5 as a standard?

A. I would rather give $5.50 a cord for slabwood than $5 for round wood.

Mr. Clark further said that it cost one-third more to prepare slabwood than round wood, and that the wood bought from the defendant in 1901 was about equal to the average of what they cut in Bangor.

At first blush it struck one as odd that with two mills operating under conditions so nearly alike that one could afford to pay $5 a cord for pulpwood and $1.50 a cord for fuel wood, and yet make money, while the other was only paying about three-fifths of this price and yet going behindhand. Mismanagement, and the frequent stoppages and mishaps, of which the plaintiffs' mill in its early days seemed to have had more than its share, no doubt contributed largely to this result. There was, however, another cause which has also contributed to it, viz., the quality of the wood furnished by the defendant. There seemed to be a concensus of opinion that perfectly good pulp could be made from slabwood, and, although Captain Partington's experience in Europe was different, it had been practically demonstrated that on this side of the Atlantic such pulp could be manufactured at a profit. It depended largely upon the price you paid for slabs. If they were not in point of size and quality up to a certain standard the cost of handling them was so altogether out of proportion to their value that there was no margin for profit.

The total quantity of wood charged to plaintiffs produced 61 1-6 cords of pulpwood and 45½ cords of fuel wood per 118,000 superficial feet. Mr. Clark said out of 100 cords at Bangor he got 16 of fuel wood and 84 for pulp, showing a material difference between the two. The total number of cords of pulp wood supplied by the defendant and used by the plaintiff was 16,029, and the number of cords of fuel wood supplied, 16,225, or more than one-half. Of the wood piled up in the field previous to November 10, 1900, 5,701¾ cords were pulp wood and 5,826 fuel wood. From November 10th to March 28th there were 5,493 cords of pulp wood and 3,327 of fuel wood, and from March 18, 1901, to August 19, 1901, the invoices showed 4,835 cords of slabwood delivered, 823 cords of fuel wood and hog fuel charged at $7,849.20, or, say, 7,849 cords at $1 per cord.

It was fairly deducible from the figures that the prices paid for wood at Bangor were not applicable to the defendant's claim in this case. Taking into consideration all these various circumstances and the relations that existed between the parties, the defendant was only entitled to charge for the pulp wood actually used by the mill at the rate of $1.90 per cord and of 90 cents per cord for fuel wood.

In regard to the charges for hauling and piling wood, under the circumstances the storing of the wood was not an improvident act, as if the mill had been stopped for want of pulpwood defendant would have been open to censure. Captain Partington's representative (Allen) had concurred in what was done, and the charge against the plaintiffs was a legitimate one. Two thousand six hundred and fifty-nine cords of pulp wood taken by plaintiffs without notifying defendant, after he had agreed to take it back would be charged at the invoiced price of $3 a cord. Sixteen hundred cords charged but not used would remain the defendant's property. The defendant's claim would, therefore, stand as follows:

2,461¾ cords pulp wood at $2.90	$ 7,139 06
2,659 cords pulp wood at $3...	7,977 00
581 cords pulp wood at $1.90..	1,103 90
2,588 cords fuel wood at $1.40.	3,623 20
3,238 cords fuel wood at 90c...	2,914 20
5,493 cords pulp wood at $1.90.	10,436 70
3,327 cords fuel wood at 90c...	2,994 30
4,835 cords pulp wood at $1.90	9,186 50
823½ cords fuel wood at 90c..	741 50
	$46,116 01

Add hog fuel (invoice price $7,849.20)		7,064 28
624,078 ft. of pine at 25 p. 1,000.		156 02
		$53,336 31
Less 1,600 cords at 90c.	$ 1,440 00	
Do. round wood as credited on invoice	1,937 93	
		3,377 93
Defendant's total claim		$49,958 38
Credit.		
By laths sold	$ 2,069 82	
Wood sold	147 64	
Cash	50,173 84	
		$52,391 30
Due by defendant		$ 2,432 92

For this amount there would be a decree in the plaintiffs' favor.

With regard to costs, many of the charges contained in sections 8, 9, 11, 13, 16 and 18 of the bill were of a very grave character, and if the defendant had been found guilty of them he would stand convicted of gross breaches of trust, involving in some of them wilful fraud and dishonesty. They were not separated by evidence. In fact, as to the most of them no attempt had been made to support them. Captain Partington, the president of the company, and Mr. Beveridge, the manager, repudiated all knowledge or responsibility in reference to it.

The plaintiffs would, therefore, pay to the defendant his taxed costs incurred by reason of the sections 8, 9, 11, 16 and 18, and so much of section 13 as complained of any fraudulent act against the defendant, and that as to the remaining costs each party must pay his own.

Barnhill, Ewing & Sanford, solicitors, with L. A. Currey, K.C., and Hon. Wm. Pugsley, Attorney-General, counsel for defendant, George S. Cushing.

Hanington & Hanington, solicitors, with M. G. Teed, K.C., and H. A. Powell, K.C., counsel for plaintiff company.

"Truth," a new four-page weekly, of Victoria, B.C., commenced publication this month.

ONTARIO'S TIMBER ASSETS.

Hon. E. J. Davis, Commissioner of Crown Lands of Ontario, in an address in the Legislature a few days ago gave the following figures in estimating the value of the timber on Crown lands of the Province:

Timber assets of the Province	$200,000,000
Pine still held by Crown, feet	10,000,000,000
Value of Crown pine	$75,000,000
Number of sales possible	20
Stumpage dues in view	$20,000,000
Prospective annual revenue from dues	$1,400,000
Pulpwood on Crown lands, cords	300,000,000
Value in dues at 25 cents a cord	$75,000,000

WILLIAM BENNET.

William Bennet, who died in Montreal last month at the age of 61, was well known in the wholesale paper trade of Canada. He established the business of Wm. Bennet & Co., paper dealers, St. Paul Street, Montreal, and after the firm went out of business he entered the service of J. C. Wilson & Co., paper, envelope and bag manufacturers, of Montreal and Lachute.

THE SOO'S INDUSTRIES.

It is now expected that the Canadian Improvement Company, chartered in New Jersey, will take over the assets of the Consolidated Lake Superior Company, and the new reorganization plan given to the stockholders of the collapsed corporation. Speyer & Co., who are to be paid their share in the $5,050,000 loan advanced by the company, and which with interest amounts to a little more than $1,600,000, set February 15th as the time limit for the promulgation of the reorganization plan. Its bankers will grant a few days' further extension in order that the new plan may be completed. A number of well-known financiers are interested in the new underwriting syndicate. These men are in earnest, and are very hopeful of the outcome of the venture. The capital of the Canadian Improvement Company will be about $53,000,000. Of this amount about $40,000,000 will be in common stock, and $13,000,000 in forty years' 5 per cent. gold first mortgage bonds. As the underwriting has been arranged, no hitch can be expected from that source.

The Canadian Improvement Company is understood to be purely an underwriting syndicate. It will bear the same relation to the operating company, for which the original name will probably be retained, as the banking house of J. P. Morgan & Company bears to the United States Steel Corporation.

Work is being pushed on the Spanish River pulp mill, and the dam is expected to be completed in April next.

The Cushing pulp mill at St. John and the St. John Sulphite Co.'s mill at Mispec remain closed, but the former expects to start up in a few days, having a stock of pulpwood on hand.

A British patent has been granted to Camara and Egana, of Granada, Spain, for a process of making paper pulp from the trash and residue of the sugar cane, sorghum corn, reeds, etc.

The "Northwest Contractor," a new Winnipeg paper, will appear this month.

Bentley & Jackson, paper machinery makers, Bury, England, have secured the contract for the big paper machines to be installed in the new paper mills at Cornwall, Ont.

The Belgo Pulp and Paper Company (formerly the Belgo-Canadian Pulp Company), of Shawinigan Falls, have commenced to make paper this month. T. R. McCarthy is their selling agent. They will ship from St. John in winter and from Montreal in summer. They will open up trade with Australia and South Africa as well as with Great Britain.

As an example of the difficulty of getting paper the Hamilton Spectator, finding itself short a few days ago, with no freight trains moving ordered a car load and a half by express from Windsor Mills, Que. The amount of the express company's bill is not stated, but it was probably more than a dollar.

A writer signing himself "Shareholder" writes to the Quebec papers asking why the commissioners for the St. Louis fair have not gathered samples of Quebec pulp and paper for exhibition. No doubt this oversight will be remedied, and if any of our manufacturers prepared an exhibit of striking form and design it would make a good impression, especially if facts were given about the immense natural advantages of Canada as a pulp and paper manufacturing country.

John Mackay, liquidator, has called a meeting of the creditors of the Sault Ste. Marie Pulp and Paper Company at the King Edward Hotel, Toronto, for Tuesday, February 23rd, to consider whether to attack the mortgage granted by the company to the Central Trust Company, of New York. This meeting has been called in accordance with the winding-up order of J. A. McAndrew, the official referee.

Between ice troubles, shortage of wood supply and difficulties of getting coal and other supplies over the railways the pulp and paper mills of Ontario and Quebec have had their trials during the present winter. As an example of the first-named troubles, the Riordon mills at Merritton have had to keep eight men at work constantly keeping the racks at their dam clear of ice. Low water in the Eastern Townships keeps the Brompton Falls pulp mill and Royal Paper Mills at East Angus closed down. The Hawkesbury pulp mill is also closed this month for lack of supplies.

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Mr. D. H. Ross, commercial agent of the Canadian Government at Melbourne, Australia, writes that a Melbourne firm interested in paper mills asks for quotations for the following lines: 1. Pulp pressed as per samples herein. (One sample of each grade required is forwarded to the Department, but they will be mailed to any one for inspection who may be desirous of opening a correspondence with the firm mentioned.) 2. Resin size used by paper makers. 3. Glue size used by paper makers. To save the import duty the sheets have to be perforated every here and there, as shown in the brown sample. If not perforated duty has to be paid on it. The local paper mills secure their supplies from Sweden, and during 1904 may require from 1,000 to 2,000 tons. The pulp is imported in bales or in rolls, iron hooped, and must be perfectly "dry and sound" when shipped. Cash will be paid in London against shipping documents. Prices should be on the basis of "ex-ship slings," Melbourne or Port Melbourne (the former for preference) at per ton of 2,240 lbs. This means the rate per ton must include cost, freight, insurance and exchange.

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The Commissioner of Crown Lands for Ontario has announced that the Government has decided to add to the existing Temagami forest reserve in the Temiskaming country a fresh reserve, to be known as the "Mississaga Reserve." This new tract will comprise some 3,000 square miles, and will be between the main line of the C.P.R. and its "Soo" extension, in the Algoma district of Ontario. This, added to the recent addition of 3,700 square miles to the Temigami reserve, will bring the Government forest reserves up to about an area of 9,000 square miles. They are composed of lands unsuited for agriculture, and will be kept as perpetual forests, the rights to cut "ripe" timber being sold from time to time under proper precautions to preserve the growing trees. It is calculated that the revenue from this source would amount to something approaching $2,000,000 a year—equal to the present revenue from Crown lands. The Government also propose to have the islands of Temigami, 1,400 or more in number, surveyed, numbered, and mapped; and their timber estimated at once.

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—E. B. Eddy, of Ottawa, speaking recently of the tariff on paper and paper products, is reported to have said: "What we want to see is a revision of the tariff in the way that will benefit everybody in Canada. There are some things on which the duty is too low, and other things in which it is too high. For instance, in the former category are paper bags. They are allowed in with 25 per cent. duty, the same as plain paper, while their valuation as compared with the paper is unquestionable, since the labor of manufacturing has been placed upon them. The duty on them should be at least 35 per cent., the same as on envelopes. We claim that there is more work on them than on envelopes. It is the greatest fallacy that goods should be allowed into Canada under conditions most injurious to our manufacturing interests, and the Government next session should take steps to remedy the matter. The lines upon which the Canadian Manufacturers' Association is working are just and right. While urging an increase of duty on certain articles they think it should be taken off articles that are not manufactured in this country. Under existing conditions Americans can send in their surplus stocks and sell them for 15 or 20 per cent. cheaper than Canadians can manufacture them."

PAPER FAMINE.

The closing down of the city newspapers for want of white paper is the latest calamity that threatens the people of Ontario, due to the inability of the railroads to haul shipments from the mills, and, in some instances, the scarcity of raw material for the manufacture of this commodity. The "World" interviewed the representatives of the largest mills doing business in this province, and the consensus of opinion points conclusively to a likely shortage before many days, if conditions do not materially change. Already several of the Toronto papers have had to seek the assistance of other more fortunate journals and borrow sufficient paper that they might issue their daily edition. For several weeks past the mills have found great difficulty supplying their customers and the situation is hourly growing more acute. Through shipments on the railroads from the East have practically been suspended. It is in the eastern part of the Dominion that the most of the paper is manufactured.

The statement has been made, too, that half the mills in Canada have shut down for lack of water. This has resulted from the scarcity of the usual fall rains last year. The wood for a number of the mills that is so urgently needed is at present tied up in the rivers, where it was impossible to have it run down last fall. Now it is frozen solid in the ice, and it is impossible to get at it. There are also thousands of cars of sulphite, ground wood pulp and other material lying on the sidings of the various railroads that cannot be got to the mills. The situation was never more acute, say some of the most prominent men in the business, and hopes are expressed that the weather may improve, so that the railroads may have an opportunity of averting a famine in paper for the newspapers. The Canada Paper Company have already withdrawn their quotations from the market, and express grave fears that they will not be able to look after the interests of any but their old customers, and then they will be likely to suffer if the situation is not relieved. The Riordon Paper Mills are also feeling the squeeze, and though willing to assist others as well as their own customers, state that they do not know how long they will be able to do this.

T. Weldon, of the E. B. Eddy branch, in Toronto, said: "The E. B. Eddy Co. is not at present suffering materially from the inability of the railroads to haul material and deliver the paper, but I cannot tell how long this will last. It has reached the stage, however, that the mills will supply no others but the old customers. From what I can judge of the present situation, I am of the opinion that before long a number of the mills will have to shut down, and I think the consumers of this kind of paper in the province will suffer greatly. The tie-up of the roads has not had so much to do with this as has the low water. The scarcity of paper is being more widely felt perhaps than any other circumstance in the troubled condition of affairs. The mills in Quebec are suffering more generally than those of the West. The mills in Quebec to some extent run their machinery by water, and the fact of low water is having a great deal to do with their shortage."

George E. S. Challes, local manager of the Riordon mills, was another gentleman, who holds little hope of the situation improving if the railroads are not aided by better climatic conditions. His summing up of the situation is as follows: "Our mills are feeling the strain greatly just at present, and while we are able to supply the demand so far we cannot tell how long we will be able to do so if the present conditions continue to prevail. I do not anticipate any serious famine, however. If the papers of the city were compelled to cease issuing for a day it would be the the longest that they would be without paper at a time. As it is at present, though, we are compelled to send a great deal of our present shipments by express. The blame that the Grand Trunk is receiving for the manner of getting their shipments

through is to my mind quite uncalled for. The people who are making all the complaint do not know what they are talking about. If they only knew the impossibility that exists in getting freight cars moved in this weather they would not be so pronounced in their remarks. We are suffering greatly by the delays of the railroads, but know that it cannot be avoided. We are now within two days' supply of coal, and do not know when we may expect more. There are several tons of coal lying only a few miles from us, but it is imposible for us to get it. It is overdue a week. There are thirty cars of wood somewhere on the railroad that are overdue two weeks."—Toronto World, February 11th.

LEGAL.

Judge Lemieux recently rendered judgment in a number of Quebec Superior Court cases, among which were the following:

Judge Teetzel has handed out judgment in the pulpwood dispute between the lumber dealers, McKenzie and Miller, of Belleville. After making certain deductions for defects and shortages in the wood supplied, he gave judgment in favor of McKenzie for $219.46.

Raiche vs. Brompton Pulp and Paper Co.—Mrs. Chevalier, nee Marie Raiche, of Sherbrooke, while on the G.T.R. platform at Bromptonville, was struck on the arm by a piece of log, from blasting operations carried on by the defendant. She sustained serious bodily injuries, causing nervous prostration. Mrs. Chevalier took an action in damages for $500 against the company. The court granted her $200, with costs. The present case is inscribed before the Court of Review, in Montreal.

The Montrose Paper Company, of Thorold, are asking the court at Toronto to hold that Thomas and Sydney E. Brown, of St. Catharines, are still liable for unpaid balances on 450 shares. Also to set aside resolutions passed by the plaintiff company in April last, releasing the defendants from the obligation to build a paper factory for the company on the ground that the passing of the resolutions was obtained by misrepresentations.

E. B. Eddy has issued a writ for $5,000 against James Sently, president, and Harry Smith, secretary, of the Hull lodge of the International Brotherhood of Papermakers, and P. M. Draper, president, and C. S. O. Boudreault, secretary of the Allied Trades Association. The complaint is that those mentioned have conspired to injure and defame E. B. Eddy by preventing people from dealing with him, and of libel in circulating printed circulars in Canada and the States; also of obstructing the workmen.

Royal Paper Mills Co. Cases.—Several actions for damages were taken by parties from Garthby against the Royal Paper Mills Co. for the flooding of their properties by the dam across the St. Francis river at the outlet of Lake Aylmer, and judgment was in favor of plaintiffs, as follows: Jos. Roy, $200; F. Gregoire, $150; A. Lepage, $160; A. Roy, $220; E. Brochu, $200; P. Lachance, $160; L. Brochu, $400; C. Lamontagne, $25; the whole with interest and costs.

FOR BINDING.

Subscribers wishing to bind the first volume of the Pulp and Paper Magazine may have a copy of the index on writing to the publishers.

The famine in pulp and paper in the States is bringing down the anger of publishers of the big dailies on the manufacturers. At the meeting of the American Newspaper Publishers' Association in New York on the 18th inst. a committee was appointed to agitate for the reduction of the duties on pulp and paper. Don Seitz and John Norris, business managers of the New York World and Times, respectively, attacked the methods of the paper combines. behalf of the World Mr. Seitz offered $10,000 toward a fund to carry on a national agitation for the removal of the duty on wood pulp for paper making, claiming that this step

was necessary for the welfare of the newspaper industry in the United States. "We should establish a bureau to give this matter its unceasing attention," he said. "We should assail Congress in the interests of free pulp and free paper. Fully fifty per cent. of the pulpwood is now drawn from Canada, and the paper business has passed beyond the protective period. Let us raise a fund large enough to be effective in maintaining our interests, one on which we can keep the country newspapers busy with their Congressmen. With the tariff out of the way, capital could be safely invested in Canada and give us our paper at living prices." Mr. Norris, of the Times declared that newspapers are to-day threatened with a paper famine, and that the manufacturers had deliberately shut down on production. The committee to which the subject had been referred reported in favor of the accumulation of a fund of $100,000 to promote an agitation "for release from the oppression of the paper combination," and this report was unanimously adopted. This action of the publishers will have a far-reaching effect on the development of the pulp and paper industries of Canada. Once the public and the publishers of the States realize that Canada offers the most advantageous field in the world for employing their own capital and at the same time cheapening their own paper products the attempts now being made by the paper combines to throttle this country will no longer hold their sympathies under the cloak of national policy.

WATERMARKS.

It is a very curious fact that some of the most ancient technical terms used in the first paper mills should be still employed by modern stationers; but we all at the present day ask for paper, describing it by peculiar, and in some instances absurd terms, in accordance with the ancient distinctive watermarks of different qualities or sizes. In olden times, when comparatively few people could read, pictures of every kind were much in use where writing would now be employed. Just as every shop and inn had a sign, so the early papermakers introduced marks by way of distinguishing the paper of their own manufacture from that of others. However, paper without any characteristic sign is the oldest, though none has been handed down to us, as the watermark denotes a certain progress in printing. Swabia is credited with the invention of making paper from linen rags, and it was first put into practice by the Holbein family at Ravensburg. The oldest document on this kind of paper is dated A.D. 1301, and bears a bull's head, the Holbein's Arms, imprinted as a watermark. In Pomerania, Friesland, Paris, and Bohemia records are extant written on this so-called bull's head paper, the oldest linen paper existing. Fust, Caxton, and Schoeffer used it in their first impressions. On many sheets also we find a clapper or rattle, such as in olden time the lepers used to carry to warn the approaching wayfarers of their dangerous proximity. This symbol is related to the Holbein hospital for lepers at Ravensburg, to which an interest was assigned in the family's paper mills. After Swabia, the Low Countries formed that part of the world in which paper manufactories were next established, and the papers here turned out for the use of the first printers have a great variety of marks, many of them being the badges of noble families in other Continental countries, who were the patrons of printers. Thus the P and the Y, sometimes separate and sometimes conjoined, are the initials of Philip the Good, Duke of Burgundy, 1419 to 1467, and Isabella, then spelt Ysebella, his wife. Caxton printed his "Game of Chess" on paper with the P imprint, and when a facsimile of the work was published as a tribute to his memory a few years ago, paper was made expressly for the purpose in exact representation of the original, and containing this watermark.

From the great abundance of accounts written on paper coming into England from our Aquitanian possessions, and the small number of documents originating

in England in the same early period, namely, the fifteenth century, written on any other material than parchment or vellum, it may be concluded that paper was a substance more familiarly known in the South of France than in England, and that it was probably to our connection with these provinces that we owe the first introduction of paper into England. But the French paper really came from the Low Countries, which at a subsequent period began to supply us direct, and continued to do so in large quantities for several centuries. The excellence of Dutch paper, its purity and durability, has never been excelled, and a famous bibliomanic speaks of the music of the rustle of leaves when it is contained in a book. The two best known watermarks of fifteenth century paper consist of a circle surmounted by a cross, signifying the Cross planted on earth; and an open hand, surmounted by either a star or cross, signifying the pastoral benediction of a priest. The first papermaker in England was one John Tate, who started mills at Hertford in the reign of Henry VII. His and his successors' watermark was a star of eight points within a double circle. The principal sorts and sizes of paper whose trade names may be explained by reference to their various original watermarks are as follows: Post paper takes its name from the post horn, which mark was in use as early as 1370. It sometimes appears on a shield, and in the seventeenth century is surmounted by a ducal coronet, in which form it still appears on our ordinary writing paper. Cap-paper had a cap like a jockey's. The first edition of "Shakespeare" will be found to contain this mostly. No doubt the general use of the term cap to various papers of the present day is due to marks of this kind. The small square or pot quarters, which were extremely popular in the sixteenth and seventeenth centuries for printing editions of plays and pamphlets, and have been recently revived for classical reprints, notably, those issued by the Camden Society, takes its name from the watermark representing the pot or tankard in common use at the time of its original manufacture. Perhaps the most curious instance, however, is that of foolscap paper, so-called because the fool's cap and bells were its original watermark. It is said to have been introduced between 1650 and 1659, and there is tradition that the Rump Parliament ordered that the fool's cap, etc., should be substituted for the Royal Arms in the paper used for official correspondence and for the journals of the House of Commons. At this period some attempt was undoubtedly made to perpetrate topical allusions by means of watermarks. In 1649 a large burlesque kind of hat, to parody the Puritan headgear, appeared as a watermark; in 1651 four crosses were exhibited, and in 1657 a regal crown.

All these symbols were equally obnoxious to the ruling powers, who may have selected the foolscap watermark as a kind of counterblast for discrediting the Monarchy. Is there humor underlying the fact that many learned but dry-as-dust books have been printed on this paper, notably, Coke's Commentary on Littleton, and Rushworth's Historical Collections? The foolscap watermark was superseded in the case of Government paper by what is taken for a figure of Britannia, but is really the Netherlands Virgin, holding a pole, not a trident, on which is a cap of liberty, while the lion rampant on the left of the figure is the Dutch lion. Of course, this official paper was made in Holland, and continued to be used by the War Office throughout the eighteenth century, though eventually the initials "G.R." were added. Other sized papers which owe their names to watermarks are crown, hand, elephant, and atlas. The fleur-de-lys watermark of demy paper is the peculiar cognizance of the House of Burgundy, and the term "Imperial" is derived from the finest specimens of papyri, which were so called by the ancients. Watermarks have at various periods been the means of detecting frauds, forgeries, and impositions in our courts of law, to say nothing of the protection they afford in the instance of

bank-notes, cheques, postage stamps, bills, etc. Many years elapsed, and many forgers were executed, before the Bank of England could evolve a watermark to defy imitation. The secret process by which this watermark is effected is most jealously guarded. When Ireland first conceived the idea of his literary forgeries, not being acquainted with the watermarks of Elizabethan MSS., he carefully selected markless sheets on which to commence. Urged forward to the production of copy, he purchased for a few shillings the fly-leaves from the stock of volumes of a second-hand bookseller. Then, hearing that the "pot" was the prevalent watermark of the reign of Elizabeth, he selected such as had the "pot" on, being careful to mingle with them a certain number of blank leaves, in order that the production on a sudden of so many watermarks might not excite suspicion. The monks of Messina used to exhibit, for a consideration, an autograph letter of the Virgin, till an unbeliever showed that the document must be either a forgery or a miracle, because the paper made of rags on which it was written bore a comparatively modern watermark. Thanks to watermarks, we are under no uncertainty respecting the date of the existence of the paper. It may have been a few years earlier, but it cannot have been later than the transaction of which it has carried down the record. We thus obtain certain fixed points, which are not forthcoming from the MS. or letterpress itself.—London Standard.

PAPER INDUSTRY OF JAPAN.

The manufacture of paper forms one of the most important industries of Japan, the value of the production amounting to over $6,000,000 per annum. About two-thirds of the total production is of the native Japanese varieties, and the remainder European. The latter is made in twelve mills, employing eighty-two machines, and having a yearly output of about 95,000 000 pounds. The capital employed in this branch of the industry is over $2,000,000, and the number of hands engaged about 3,300. The native papers are almost universally produced in the homes of the Japanese, some 67,000 households being occupied with this industry. They are made principally from the bark of the mulberry tree and other plants, of which the most important is the kodzu. The shoots of the first year are barked, and, after the leaves have been removed, furnish strips of several yards in length, which are cut into lengths of about a yard, and tied into bundles. These are then softened in running water, and gently boiled in vats containing wood ashes. The mixture is then treated with channeled mallets on thick wooden planks. The product is twisted and turned frequently under water until it becomes a pulpy mass, which passes into the hands of the artisan, who transforms it into paper. The fibres are fastened together with a cement made of the roots of a certain plant. By using a rectangular sieve of very fine bamboo fibres, the necessary quantity of pulp is removed, and, after all the water has filtered through the sieve, the leaf is partly dried; after which it is rubbed with a soft instrument on a plank and exposed to the sun until completely dried, when it is easily detached from the plank.

The Japanese have been engaged in this industry for many centuries, and the skill acquired in this art in conjunction with the quality of the raw materials used enable them to produce an article incomparably superior to the average class of papers in use in Europe and America, some of the lightest makes being so tough as to be almost untearable. This native paper is put to a variety of uses for which other makes would be entirely unfit. It replaces window glass, and fastened to a properly made lattice it admits a gentle, uniform light to the interior of dwellings. In the form of cord it has remarkable strength. Gilded and cut into narrow strips, it is used for embroidery, and to this fact Japanese brocades owe their gentle brilliancy and that delicacy imparted to our mediæval silks by filaments

of Cyprus gold. Its incomparable constitution is closely connected with the Japanese arts of writing and painting, both of which use the soft brush where we employ the pen or pencil. The paper, rapidly absorbing India ink, enables the writer to use his brush freely and lightly on its surface. The Japanese artist in tracing designs for wood engraving, paints on a leaf of the most tender kodzu paper, which allows the design to appear on the opposite side; then he applies this leaf to the block face downward, and thus engraves his subject. It is well known also that Japanese papers are used for the impression of fine work that is sought eagerly by bibliophiles. In every branch of industrial art in Japan paper plays an important part in some way or another. The artist in lacquer uses it to preserve the solidity of his wooden background, on whose durability depends the life of his work, expecting that the paper will protect it from heat and moisture.

TESTING THE TRANSVERSE STRENGTH OF PAPER.

Cases frequently occur where it is desirable to make comparative tests of the strength of papers perpendicularly to their surface, or, in other words, to determine their transverse strength. The particular case which led to the elaboration of the method about to be described was the tearing of the upper layer of a printing paper in the printing, the torn upper layer adhering to the plate, and it seemed desirable to devise some means whereby values for the transverse strength of the paper could be obtained. The chief difficulty which had first to be overcome was the fixing of the paper so as to allow the transversely applied tractive force to act upon it. This was done by cementing pieces of the paper to be tested between two square wooden blocks of a fixed size, so that the surface areas fitted exactly.

Surfaces of varying areas and various adhesive media were employed. The areas employed were as large as possible, as irregularities in the quality of the paper increase error, the smaller the size of the area chosen. The area finally chosen was one square centimetre, although the papers operated on were of low tenacity, and contained a large proportion of mechanical wood. The reason for this was that the testing machine was not strong enough to apply the tension necessary for larger areas, and because it is difficult to cement large areas uniformly.

Aqueous solutions cannot be used as adhesives, as the moisture acts on the paper. Animal size also cannot be used, likewise substances which impregnate the paper. The only adhesive media which can be employed are substances which melt at as low a temperature as possible, and are stable. Those best suited for all purposes have been found to be Canada balsam and sealing wax, the latter being the more preferable of the two, the only drawback being that the heat does act to some extent on the paper, which, however, cannot, unfortunately, be avoided. Care should be taken for this reason not to heat the wax much above its melting point. The tests were carried out as follows:

One end of a block of wood three centimetres long is first carefully rubbed down perfectly level with sandpaper, and then dipped into melted sealing wax. The block with the adhering melted wax is then quickly pressed down upon a piece of the paper to be tested. The end of the other block is then coated with sealing wax in the same way and quickly pressed against the other side of the piece of paper cemented to the first block, care being taken that both blocks are in perfect alignment. The superfluous wax and paper is then trimmed off with a sharp knife, and a couple of strong screw eyes screwed into the outer ends of the blocks. Tapes are passed through the eyes and attached to the clamps of the Schopper tester, and the machine set in action.

About fifteen papers of the same kind were examined, and ten tests made on each, to ensure a good average. The mean values obtained varied between

4.21 and 7.34 kilogrammes per square centimetre. The difference between the individual tests and the average value is in many cases considerable, but it is due to the comparatively primitive method of holding the paper and the small pieces employed, and did not amount to more than three kilogrammes at most, i.e., 1.5 kilogrammes above and below the mean value. This difference depends very much upon the properties of the paper, so that the tests are considerably influenced thereby.

In good writing papers the transverse strength is greater per square centimetre than can be measured with the small Schopper machine, and a testing machine such as is employed for textile goods must be employed. In tough papers also difficulties crop up in the cementing operation, the internal strength and adhesive power of the sealing wax being less than that of the paper, so that it is merely torn away from the wax instead of being parted transversely. A more powerful adhesive is thus necessary for this purpose. This method of testing, however, is principally of most value for printing papers, and the process when carried out as above described can and does afford some very valuable information.—Dr. Klemm, in Der Papier Fabrikant.

THE EDDY COMPANY'S STRIKE.

The strikers at the Eddy Company's mill have been unsuccessful, as the E. B. Eddy Company had all their paper machines in operation on February 11th. "We could have started the seventh some time ago had there been any necessity for it, for we had all the men we wanted," said a member of the firm to the Ottawa Free Press representative. "We have taken our advertisements for help from the paper because we had more applications for places than we had places to fill." Everything in and about the mill indicates great activity. The men appear to be quieter than usual, though they hold their meetings as before. A goodly number of them have already sought work in other cities. This they may have some difficulty in doing as at the 27th annual meeting of the American Paper and Pulp Association in New York, at which 800 mills were represented, it was decided not to employ any man who goes on strike until the termination of the trouble. The manufacturers will also require of their employees certificates from their former employers.

The "Tribune" newspaper building, Winnipeg, Man., was destroyed by fire on February 7th. Loss, $50,000, that of the newspaper plant being $15,000.

The latest colony to fall into line on the preferential tariff is British Guiana, a crown colony, the population of which is about 300,000. The colony has an aggregate trade of between twenty and thirty million dollars. British Guiana imported last year from Canada paper to the value of $2,003 and pulp to the value of $1,684. It is needless to say that under the preferential tariff Canadian exports in these lines can be largely increased.

Great Britain exports to Canada more of some classes of paper than she does to the United States. The latter took of British writing papers, printing papers and envelopes to the value of £23,876 in the calendar year of 1901. £35,968 in 1902, and £31,490 in 1903, while Canada took £45,212 in 1901, £44,856 in 1902, and £53,719 in 1903. Of all other classes of papers to these countries the figures were as follows: To the United States in 1901 £28,668, in 1902 £26,931, and in 1903 £28,920; to Canada, 1901, £9,984; 1902, £11,340; and 1903, £14,978. These figures show that relative to population Canada is a much better customer than the United States, and that the preferential tariff is beginning to tell in favor of the Mother Country. How much more it would tell in her favor if British paper men were awake will be seen from the editorial in this issue.

NEW COMPANIES.

The Scott Manufacturing Co., Limited, Toronto. Capital $25,000. To purchase the patent for improvements in paper vessels, and to manufacture and sell paper vessels, boxes and all other paper products. H. J. Scott, Walter Scott, F. L. Ratcliff, S. J. Douglas, and N. J. Ratcliff, of Toronto. The patent referred to is an improved pail for carrying oysters, etc., manufactured from wood fibre.

J. T. Marchand & Co., Limited, Montreal. Capital $45,000. To carry on business as manufacturers and dealers in lumber and wood products of all kinds. To operate timber limits, and wooded lands of all descriptions; also to operate sawmills, factories, planing mills, drying kilns, sheds and all other buildings and machinery necessary to work up the products of the forest into finished articles of commerce. J. T. Marchand, J. T. Scanlan, L. H. Pinsonnault, Jean Malo, F. J. Pelletier, of Montreal.

The firm of Douglas & Ratcliff, paper dealers, has been incorporated under the name of Douglas & Ratcliff, Limited, Toronto. Capital $40,000. To manufacture and deal in all kinds of paper, paper bags and other accessories of the paper trade. S. J. Douglas, F. L. Ratcliff, G. Powley, Mary Douglas and Fannie C. Ratcliff, of Toronto.

Crothers Lumber Co., Limited, Victoria, B.C. Capital $24,000. To carry on the manufacturing and shipping of lumber; to manufacture and deal in wood, pulp, and paper, and in all articles in which wood forms a component part; to build and operate factories, sawmills, pulp mills and paper mills, etc.

The Empire Lumber Co., Limited, Victoria, B.C. Capital $3,000,000. To manufacture and deal in articles of all kinds in the manufacture of which timber or wood is used or forms a component part, etc.

Ritchie & Ramsay, Limited, New Toronto, Ont. Capital $200,000. To carry on the business of manufacturing and dealing in pulp and paper, and merchandise of which pulp or paper is a constituent. F. A. Ritchie, C. N. Ramsay, C. H. Smith, and J. J. Warren, of Toronto, and C. W. Meakins, of Montreal.

PERSONAL.

Melville Portal, head of the famous firm which for generations has manufactured at Laverstoke the paper on which Bank of England notes are printed, is dead. The founder of the family was Henri Portal, a descendant of some French Huguenots, who as a means of subsistence, built a paper mill on the River Test, at Laverstoke, and owing partly to the peculiarity in the water of the Test, paper of so fine a quality was turned out that the Bank of England granted him the privilege of making its bank-note paper. When his discendant John Portal, was lying mortally ill in the late forties, the story goes that John's two sons, Melville and Wyndham, were given the choice of his property, and the former took the paper mill and the latter the estates. The second son (now Sir William Portal), found his property continuously dwindling in value, while Melville's mills brought in enormous riches.

The following enquiry was received recently at the Canadian Section of the Imperial Institute. A firm manufacturing paper bags of various kinds wish to develop trade in Canada, and with that object in view would like to get into communication with a first-class Canadian house prepared to undertake their agency.

It appears that German paper makers are using British labels and watermarks. A correspondent, writing in the Papier Zeitung, states that in various stationers' shops may be seen writing papers, beautifully got up, with English marks. He asked for a German make, when he was told that all the papers shown were German, but had English marks, which, it appears, are not forbidden by law.

READY-MADE ROSIN SIZING.

An important item in the manufacture of writing and envelope papers is the sizing, the more so as expenses play an important part at this stage of the manufacture. It may be truly said that every paper maker, even down to the beaterman, who takes an interest in his profession, has gone earnestly into the sizing question from a practical standpoint, and endless experiments have been made with this, that, and the other; but, as every one knows, experiments which work perfectly in the laboratory, and seem to promise almost everything, do not work satisfactorily on a large scale, and have to be carried out properly in order to get a proper insight into their mechanism.

The same thing is true of the ready-made rosin sizes of various origins now to be purchased in the market. These rosin sizes, or soaps, when they first came out, did not meet with much success when offered to the various paper mills; printed instructions and all sorts of directions were provided, and when the stuff was tried it was more or less a failure. A wordy correspondence on both sides was the result, and some makers went back to the old methods, frequently with the remark that they would try the new method again when they had proved that they could produce proper results. In short, much distrust was shown to the new method on all sides. The rosin size makers however, were not to be discouraged, firmly believing that a good thing takes time.

In order to arrive at a proper decision as to the merits of the new and old methods of sizing, the best course will be to compare one with the other. Starting in the old process with the crushing of the rosin, every one will admit that this was a process which could, and very easily did, cause all sorts of trouble in a mill. Supposing that all the crushers were situate outside the building (which was by no means the case), it was not at all impossible for rosin dust to get into the mill, and many rosin spots in paper have been caused by raw rosin getting into the pulp. This cause of damage to pulp no longer exists. Again, in the old methods of sizing the paper maker was dependent, more or less, upon the skill of the size boiler. At all events, the most reliable man was always selected for the job, although, nevertheless, matters did not always turn out by any means as they should have done.

This is also now a thing of the past; any man may be set to boil size, and everything works satisfactorily. Whereas, formerly, a man required the whole day to prepare the size required for a moderately sized mill, it now takes only one or two hours to do the same thing. This, of course, means economy to start with. It is now, and has been for a long time, proved, both theoretically and practically, that free rosin does size, or rather helps to size, for it has not yet been proved that saponified rosin does not size. In any case, however, it has lately been shown that sizing is cheaper and better the more free rosin there is in the size, which is another reason why such rosin soaps should be used so as to economize still further. Unfortunately, some of the new rosin size makers do not pay sufficient attention to this point.

Most makers of this commodity make rosin soaps containing about 20 per cent. to 25 per cent. of free rosin or little more than could be obtained by the old methods. There are however, other advantages which do not count here. Seeing that commercial rosin soap is much cleaner to use, and a more uniform product can be obtained by its aid, and assuming also that the proper directions are followed so that difficulties cannot arise in that direction, it may be safely said that these advantages and the attendant economy fully justify the abandonment of the old method of preparing the rosin soap on one's own account, and the adoption of the ready-made commercial article.

A concrete example or two may perhaps be of interest. A rosin soap containing 20 per cent. free rosin, 50 per cent. combined rosin, 22 per cent. water,

and 8 per cent. soda was employed for a period of twelve months. The soap was dissolved in water heated to a temperature of from 50 to 70 degrees C. With the exception of some slight irregularities, the sizing was found to be entirely satisfactory. The average size used was about 4 per cent. of rosin, calculated dry. The cost of the sizing for 100 kilos. of paper was about one shilling, and the quantity of stuff used per 100 kilos. of finished paper 120 kilos. Owing to circumstances, another make of soap was employed, containing 40 per cent. of free rosin and 31 per cent. combined rosin. The method of solution was also different, boiling water being employed. Four per cent. or thereabout of rosin, calculated dry, were used for sizing, and the cost per 100 kilos. of paper only sevenpence, due to the large saving in alum. The quantity of stuff used per 100 kilos. of finished paper was, however, slightly higher and amounted to 126 kilos.

The decrease in the cost of sizing in the second case is due to the increase of free rosin, which makes less aluminum sulphate necessary than heretofore. On the other hand, the consumption of material has risen by about 5 per cent., thus entailing greater loss. The loss is, in my opinion, due to the fact that less saponified or combined rosin is required, owing to the large amount of free rosin present. A further result is that less aluminum sulphate is required to precipitate the saponified rosin. It is obvious, of course, that the precipitate of aluminum rosinate upon the fibres of the paper increases its weight, and conversely, the less aluminum sulphate is used to precipitate the rosin the thinner the precipitate will be.

The main point is, however, that the size acts as a binding agent for the other filling materials. It must be borne in mind, however, that the less saponified rosin there is used the weaker the binding of the filling materials will be, for it is obvious that free rosin only comes into actual operation—i.e., sizes—upon the drying cylinder. This shows, therefore, that free rosin binds the filling materials to the fibres only slightly, whereas, when the saponified rosin is precipitated by means of aluminum sulphate the binding action is greatly improved.

Looking now at the sizing expenses and figures for the consumption of stuff above quoted, it may be said that the increase in consumption of material is pretty well covered by the decrease in the cost of sizing; in fact, there may be even a slight saving, but there are no actual figures to go by. From the above facts it would seem, therefore, that it is much the same what kind of rosin soap is used, and it still remains to be discovered for what reasons, if any, any particular kind of rosin soap, should be be given the preference over others. Although I myself was only persuaded with much difficulty to use a rosin soap containing a higher percentage of free rosin than that which I had formerly employed, I must admit, nevertheless, that it offers many advantages, provided, of course, that the proper directions for its use be faithfully followed.

A most important point to be noted is that the rosin soap must always be kept as thin as water, but without boiling. The mixing or dissolving of the size should be done with boiling water, and then sufficient cold water added. This mixing with boiling water is important, and also an advantage, as other sizing methods require the water to be kept at a temperature of from 60 to 70 degrees C., with the risk always of fluctuations thereof, which are fatal to good work. Where boiling water is used, such fluctuations are entirely excluded, and no thermometers or similar instruments are necessary. The soap dissolves perfectly in a short time, no variation in the percentage of total rosin is noticeable, and there is absolutely no sediment.

A further advantage gained by the use of a rosin soap containing a large amount of free rosin—i.e., one which has been boiled with a small quantity of soda—is that the frothing of the stuff

at the sand traps is completely avoided, excepting, of course, materials dyed with colors containing a large amount of dextrin. A week's work can be done without the slightest appearance of froth. Where frothing does occur, however, there is always loss of material, and sprays and jets are not of much use to stop it. The nuisance can, nevertheless, be avoided by using more soap. Some may object to the increased consumption of material above mentioned, but this may be obviated by the use of a good strainer, and the saving on the sizing will be just as great, if not greater.

To sum up, the advantages to be reaped by the use of ready-made commercial rosin soap containing a large proportion of free rosin are as follows: (1) Cheaper sizing; (2) cleanly and safe to use; (3) no staining or rotting of the paper owing to the small quantity of aluminum sulphate necessary in so far as the above evils are due to the latter; (4) economy in space and labor for storage and handling of aluminum sulphate, and (5) absence of froth on the machine. From the above remarks every one will see that the economy claimed by the size makers is really a profitable one, and that ready-made rosin soap, especially soap with a high percentage of free rosin, will, although perhaps only gradually, certainly come into more general use in the paper trade.—Wochenblatt fur Papierfabrikation.

THE SCANDINAVIAN COMBINE.

A writer in the Paper Maker, London, who seems familiar with pulp conditions in Sweden and Norway, has the following on the central selling office in Christiania:

"I have taken the opportunity to discuss the Scandinavian mechanical wood pulp combination for the purpose of selling through a central office in Christiania, but I find most paper-makers do not regard it seriously. I should think I have spoken with quite thirty or forty paper-makers on the subject, but they refuse to believe that such a combination can stand. Several of the largest users of Scandinavian ground wood pulp state that they will decline to do business with the central office direct, but will pass their orders through the agents in this country with whom they have done business for years—men they know, and men they can rely on. One big Kentish paper-maker, who is a good customer to both Sweden and Norway, said: 'If the Swedish and Norwegian pulp makers are going to try to squeeze us, then we shall retaliate by combining together and erecting mills in Canada. You see, we have always got a trump card to play.'

"The biggest paper-making concern in the West, through one of its directors, spoke in the same strain. He also added: 'If the Scandinavians are foolish enough to think that by such amalgamation of interests they can monopolize the pulp trade in this country, and have everything entirely their own way with us, then I can assure you they will find out that they have made a huge mistake.' Said a prominent East Lancashire paper maker: 'There's no doubt the pulp makers of Norway and Sweden have been having a very rough time, but it is entirely their own fault. If they are merely combining to fix a reasonable standard market price, and nothing more, I don't blame them; but will it stop at that? I think not.'"

TREATING CARDBOARD.

According to the Papier Zeitung, it is a good plan to add some collodion to the pulp in order to render cardboard sufficiently rigid, though without altogether depriving it of suppleness. The collodion can be prepared as follows: Dissolve 1 kilogramme of caustic soda in 5 litres of water, in an iron or earthenware vessel; mix separately, in a wooden vat, 10 kilogrammes of potato starch with 40 litres of cold water, and add to it from time to time small quantities of the soda solution, stirring the

mixture continuously meanwhile. When it becomes difficult to stir it any longer, the addition of the soda may be suspended, but the stirring continued until the surface of the mixture becomes smooth and even as a mirror. The entire operation should not take more than five minutes, and the collodion thus prepared costs only about ½d. per kilo. Three or four kilos of it should be added to every cwt. of pulp. Its special advantage is that it helps to bind together any short fibres that the washing processes may have failed to affect.

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The following enquiry was recently received at Canadian Section of the Imperial Institute, London, Eng.: The manufacturers of decorated wall papers and fabrics wish to introduce their specialities into Canada, and ask to be placed in communication with trustworthy Canadian firms that could deal in same.

At the annual meeting of shareholders of the Rolland Paper Company, the following directors were elected for the ensuing year: The Hon. J. D. Rolland, president; O. Rolland vice-president; R. Bedard, secretary-treasurer; S. J. B. Rolland, P. D. Rolland, J. L. Archambault, A. A. Foucher, and the Hon. R. Prefontaine. The report showed the year to have been very satisfactory.

THE PULP MARKET.

The Canadian pulp market is in much the same condition now as it was last month —mills short of wood and customers getting short of supplies. For mechanical pulp $20 to $22.50 has been offered at the mill, but there is practically no material to be had even at that figure, as those mills that are in operation are running on contracts already made; while a number of mills that would like to be in the market are at a standstill for want of wood, lack of power or other causes. The smaller rivers are frozen solid in some cases, while the larger rivers are much troubled by fragile and anchor ice. It is feared that owing to the unusual depth of snow the freshets that will ensue if the snow is taken away by spring rains, instead of gradual thawing, may cause more trouble for a time than the hard weather. In preparation for a possible flood the proprietors of the Georgetown paper mills are blasting the ice out of the River Credit by dynamite. Sulphite pulp is scarce, and $40 to $42.50 is asked for what is in the market, which at the present time is not more than 15 tons per day all told, outside of what is being made under contract.

BRITISH CHEMICAL MARKET.

Bleaching powder, 35/37 per cent., £4 5s. to £4 10s. per ton, f.o.r., Lancashire, f.o.b. Newcastle, or f.o.r. Bristol; caus-

tic soda, white, 78/79 per cent., £11 to £11 2s. 6d. per ton; do., 76/77 per cent., £10 10s. to £10 12s. 6d. per ton; do., 70 per cent., £9 7s. 6d. to £9 15s. per ton, f.o.r. Lancashire; do., 60 per cent., £8 15s. to £8 17s. 6d. per ton; do., cream, 60 per cent., £8 15s. to £8 17s. 6d. per ton; caustic bottoms, £6 15s. to £7 per ton; alkali, 58 per cent., £4 10s. to £4 15s. per ton; soda ash, 48 to 56 per cent., £6 to £6 5s. per ton; sulphate of alumina, £3 5s. to £3 7s. 6d. per ton; sulphite of soda, £5 per ton, all f.o.r. Lancashire; hyposulphite of soda (antichlor), casks or kegs, £5 10s. to £6 per ton, ex ship, Thames; soda, crystals, in casks or bags, £3 5s. to £3 7s. 6d. per ton, f.o.r. Lancashire; soda crystals (Newcastle make), £3 5s. to £3 7s. 6d. per ton, ex ship, Thames; crystallized lump alum, £5 7s. 6d. to £5 15s., ex ship or wharf; aluminous cake, £2 15s. to £3 10s. per ton; muriatic acid (hydrochloric), £2 10s. to £3 per ton, in carboys; sulphuric acid (oil of vitriol), 1¼d. per lb., in carboys.

Plates Without Screws

The Blaisdell Screwless Screen Plate Holder

is placed before the Canadian mills as the first practical device on the market.

Fig 1.

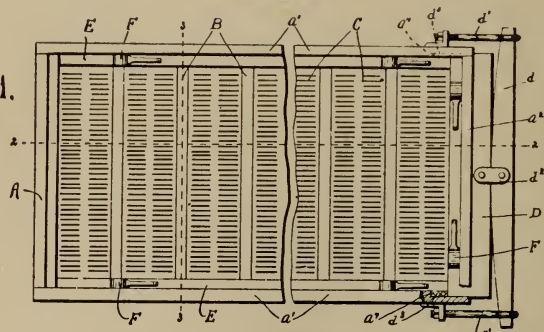


Fig. 2.

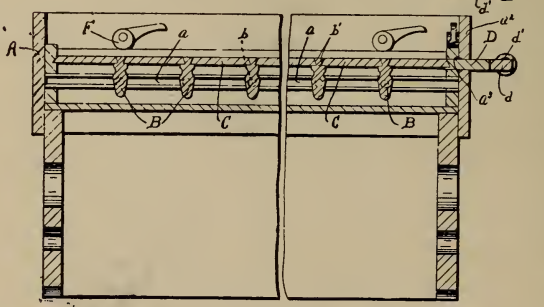


Fig. 3.

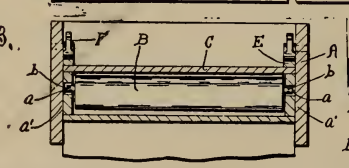


Fig. 4.

These plates are fixed with a clamping device and can be removed in a few seconds.

Made for all kinds of paper, from tissue to cardboard and will fit any diaphragm screen

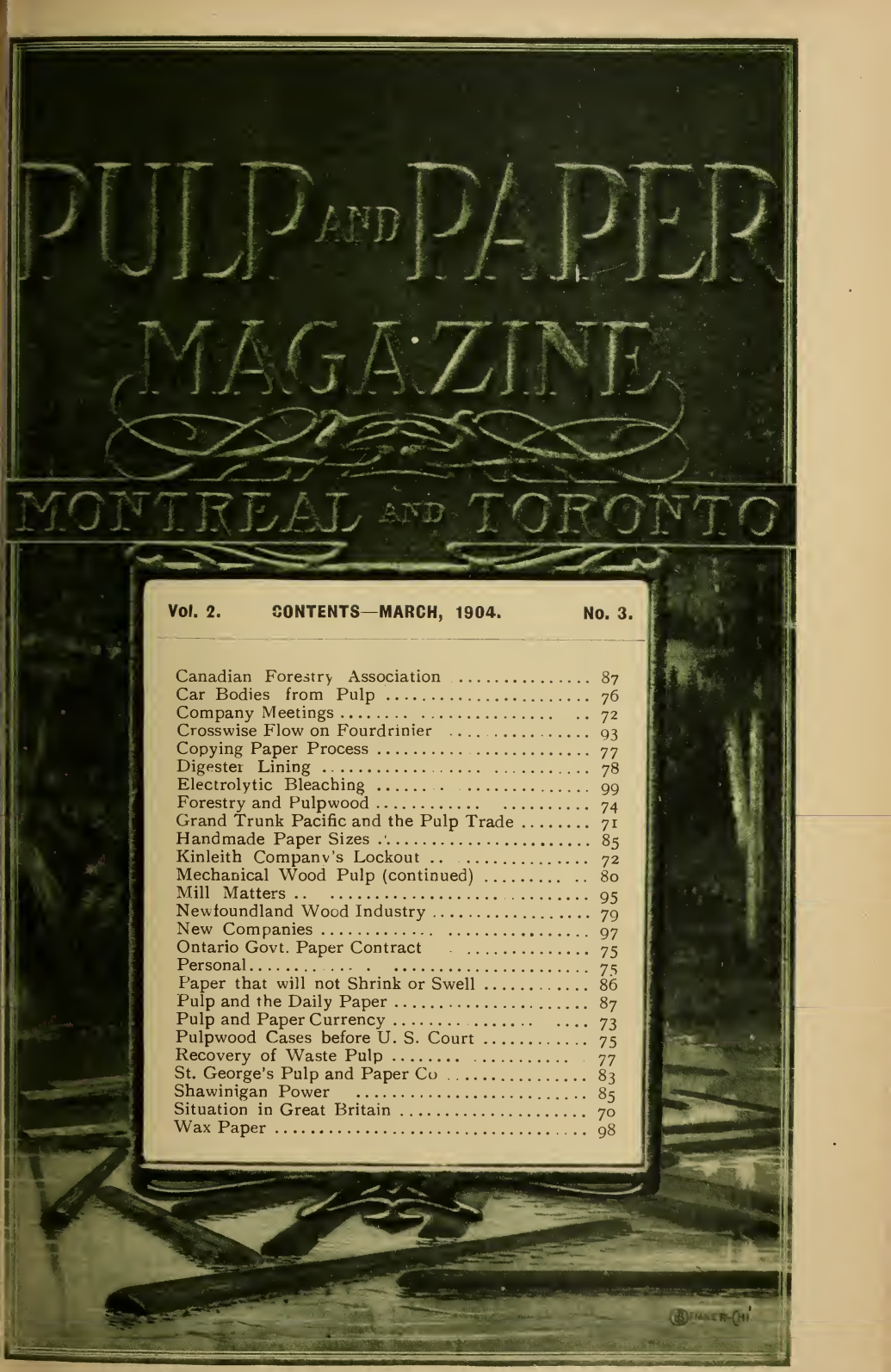
The cradle is of bronze, and there is no iron inside the vat; and no wood under the plates to cause lumpy stock.

Patentees are open to negotiate for the Canadian rights.

ADDRESS

BLAISDELL SCREEN PLATE CO.,

Oakland, = = = Maine.



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THE
PULP AND PAPER MAGAZINE OF CANADA

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Pulp and Paper Magazine

A monthly magazine devoted to the interests of Canadian pulp and paper manufacturers and the paper trade. issued between the 10th and 15th of each month.

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Changes of advertisements should be in the publishers hands not later than the 1st of the month, and, where proofs are required, four days earlier. Cuts should be sent to the Toronto office, by mail, not by express.

BIGGAR-SAMUEL, LIMITED,
PUBLISHERS
18 Court St., TORONTO. Fraser Bldg., MONTREAL.

THE SITUATION IN GREAT BRITAIN.

Many matters of interest to the Canadian pulp and paper industries were discussed at the annual meeting of the Paper Makers' Association of Great Britain last month. For one thing the Association declared itself again in favor of the compulsory introduction of the Metric System of weights and measures, and it recommended to its members the advantages of giving prizes to mill employees for suggestions for any improvements in the processes of paper manufacture. This shows that the British paper makers realize the need of keeping up with the times, and such a plan might be considered by the owners of pulp and paper mills in Canada.

Naturally, a good deal of attention was devoted the fiscal question. It will be remembered that at the previous meeting a motion was carried approving of the Chamberlain preferential tariff as applied to the paper trade, but the present annual meeting developed a considerable division of opinion on this big question, and it is evident that no change is likely to be made in the fiscal policy of the Mother Country without very careful study. If the preferential tariff is adopted, it will not be done in haste. On the report of a committee it was decided that the Association should give evidence before Mr. Chamberlain's Commission, and in discussing the resolution Mr. Chater, chairman of the committee, gave some instructive statistics of the British paper trade for the last two decades. He stated "that during the twenty years from 1882 to 1902, the production of paper in Great Britain had increased by 138 per cent.—i.e., it had been multiplied two and one-third times; whilst the quantity of foreign paper imported had increased in the same period by 680 per cent.—i.e., it has been multiplied very nearly eight times. During the first ten years, from 1882 to 1892, British production had increased by 51 per cent., and

during the last ten years, from 1892 to 1902, by 56 per cent. Foreign importation had increased in the first period by 240 per cent., and in the second by 130 per cent. The proportion of foreign importation to British production had been in 1882, nearly 8 per cent.; in 1892 say, 17½ per cent.; in 1902, 26 per cent. In regard to the future, it was only possible to estimate the probabilities. He thought that if the fiscal policy remained as at present, although great increase of productive power was now going on in British mills—old machines being improved, new and larger machines taking the place of old and small ones—they could not expect the expansion of trade to continue at the rate of the last ten years. It would be safer to assume that the increase at the end of 1912 would be at the rate of 33 1-3 per cent. instead of 56 per cent. This would bring the quantity of the British paper to 1,000,000 tons per annum. For the same reason—viz., that the consumption of paper could not be expected to increase as fast as in the recent past—they should not assume that the importation of foreign paper would be increased by 130 per cent. at the end of ten years. They must, however, allow for a large increase if free importations continued. He thought it would be fair to allow for an advance at the rate of 100 per cent. instead of 130 per cent., as in the past. This would make the foreign importation amount to 390,000 tons, which would bring the proportion to say, 40 per cent. If these calculations were at all near the mark, the result could not be faced by British papermakers with equanimity." The committee appeared to be of opinion that the newspapers and publishers generally, who would regard paper as their raw material, would oppose the placing of paper on the list of dutiable goods, and the committee would, therefore, not ask for a duty of more than 10 per cent., but as the fariff scheme involved a preference to the colonies, it is suggested to allow Canada a rebate of one-third off Canadian paper. As pulp would be regarded as a raw material, and as Canada only supplies now about one-eighth of the total requirements of Great Britain in pulp, many of the paper makers would like to see pulp left on the free list. Others would be quite willing to give Canada a small preference, which, while it would not raise the price of pulp in the home market would give a large impetus to a growing Canadian industry and would be of special advantage where a paper mill owned its pulp mill in Canada or had special trade connections here.

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—A good deal of space is given in this issue to the proceedings of the Canadian Forestry Association because the educational work of that organization is of the highest importance to the country. It is not alone that the permanence of the pulp and paper industries depends upon the intelligent management of our forest areas, but the future success of our agricultural, dairy, fruit growing and all other interests affected by the rainfall hinge upon the conservation of existing forests and the restoration of forests to those districts now denuded of trees. As the people of the United States have already learned, and as we also are now beginning to realize, the stripping of trees from the hillsides that form the sources of rivers and streams in settled districts, means a recurrence of spring freshets followed by more or less sum-

mer droughts and the drying up of small streams during a part of the year. Every old resident of southern Ontario and Quebec knows that streams which now dry up in the summer and autumn once ran all the year round when their sources were surrounded by woods. The spring freshets, which increase year by year, are also the cause of deterioration of the soil by sweeping away the rich vegetable mould from the surface, and so the evils of indiscriminate forest destruction are multiplied. It was interesting to hear the declaration of one farmer at the meeting that the revenue from a certain wood lot had proved to be more than from grain growing, and yet by careful cutting the growth of the woods had been maintained. It is true that Canada has immense tracts of forests still untouched, but this is no reason why the settled regions should be gradually turned into deserts, or why the thousands of water-powers, which are of such importance to our mills should be ruined through reckless destruction of woods around the watersheds. Among the many interesting points discussed at the meeting was that raised by Mr. Bertram, as to the possibility of working up pulpwood from patchy districts of spruce, hemlock, etc., by means of small mills more or less portable. In Scandinavia a large proportion of pulp manufacturing is done by mills of very small capacity, operated by single families, and these mills appear to be successful. Such an experiment might lead to a great extension of the pulp trade in districts where it could not be made to pay with the large mills now in favor.

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—Dr. Robert Bell, acting director of the Canadian Geological Survey, agrees with Sir Sandford Fleming that the Grand Trunk Pacific Railway should strike much further north than its promoters have contemplated, and in a recent lecture in Quebec, he showed the wealth of the northern regions towards Hudson Bay in timber. Such a route would give an immense impetus to the pulp trade of Canada as the railway would cross dozens of rivers down which pulpwood could be floated, and would tap a vast area of pulpwood country southwest of James' Bay, which has not yet been exploited and concerning which the general public know nothing. In a letter to the Canadian Engineer, Thomas Frood points out the immense strategic value of a far northerly route for any new transcontinental railway, and Sir Sandford Fleming in a recent pamphlet confirms this opinion, reinforcing it with arguments on its commercial advantages. A route such as this, Sir Sandford points out, would save 1,423 statute miles over any existing route from Yokohama to Liverpool. There is not only this saving in distance in connecting Europe with Asia, by way of Canada, but the northerly route gives easier grades which is an advantage of great practical importance in cost of operating. But more important still is the fact that a new Canada will be created in the region to be traversed which could not be developed except by such an arterial line of transportation. Sir Sandford speaks of the arable land making a belt whose northern edge would be 400 miles away from the frontier. The Canadian Engineer believes this belt of cultivable land will prove to be more than 700 miles broad, measured from any point west of Winnipeg, and that the forest and mineral wealth of the eastern section will also make it pay to keep north through Ontario and Quebec, possibly

terminating eventually at a port on the east coast of Newfoundland or on the coast of Labrador, when science has triumphed over the difficulties of navigation in that part of the ocean. In the light of the success of State-owned railways in India, South Africa and Australia, this great highway should be built and owned by the Dominion. Such a road having a branch to James' Bay would afford a sea outlet for pulp and paper which would be available through Hudson Straits for four months in the year, during which the bulk of the shipments could be made at cheaper rates than from inland points to the Atlantic seaboard. This would mean the creation of an immense pulp and paper industry in portions of Canada which cannot be reached under present conditions.

KINLEITH COMPANY'S LOCKOUT.

A lockout took place at the Kinleith Paper Company's works, on the 28th ult. About eighty workers, men and women, were affected. The trouble was due to the fact the company wished to go back to the old "long time" schedule of 71 hours a week for tower men and 58 hours for day workers. Last May the short schedule of 66 and 55 hours, respectively, was introduced, and the men claim that just as much paper has been turned out under the short schedule as under the long. The company now asks the tower men to work up to 11 o'clock Saturday night instead of up to 6, and the laborers up to 3 instead of 12 on Saturdays. Notices were posted up in the factory announcing that the old schedule would be resumed on February 27th, and stating that all workers who were not willing to go back to it would be paid off. The men had a meeting and refused to go back to the old schedule. F. A. Ritchie, president of the company, makes the following statement regarding the company's position: "In the spring of last year we put our mill on what is known as the short time. It was then expressly agreed by our employees that they would resume the longer at the expiration of six months, if all the competing mills had not in the meantime adopted the shorter time. We accordingly expected them to keep faith with us. A similar agreement was made by another local mill, and they some months ago resumed the longer hours. We have always treated our help with consideration and paid them the highest wages obtainable for the various classes of labor. Under the circumstances, this breach of faith on their part is most unwarrantable. We posted notices of the change two weeks before, to take effect on Feb. 27th, and received no intimation that it would not be complied with until the 26th. We then posted notices dismissing any employees who did not report for duty according to the new schedule and these were laid off today. It will only be a matter of a few days, and we will have the mill running full, as we have already a number of applications. We will in future run an 'open mill.' "

The locked-out men are being replaced by others and the mill has not been closed down in consequence of the lockout.

COMPANY MEETINGS.

The annual meeting of the Canada Paper Company was held on March 8th, H. Montagu Allan presiding. The annual report was presented and declared satisfactory. The pulp and paper mill at St. Francis is operating successfully, and the prospects for the coming year are considered to be promising. The following directors and officers were elected: H. Montagu Allan, president; H. G. Holt, vice-president; John Macfarlane, C. R. Hosmer, H. Markland Molson, Hugh A. Allan, the Hon. Robt. MacKay. F. J. Campbell, general man-

ager, and W. H. Parsons, secretary-treasurer.

The annual meeting of the E. B. Eddy Company was held on March 2nd in Hull, Que., with a full attendance of members. The officers elected are the same as last year: President and managing director, E. B. Eddy; vice-president, S. S. Cushman; secretary-treasurer, W. H. Rowley; superintendent, G. H. Millen; solicitor, J. J. Gormully.

The annual meeting of the Globe Printing Co. was held in Toronto on March 9th, the following directors and officers being elected: Robert Jaffray, president; W. B. McMurrich, K.C., vice-president; Hugh Blain, A. F. Rutter, N. W. Powell, K.C.; W. G. Jaffray, and James Watt, secretary.

Pulp & Paper Currency

It is reported that the newly incorporated company of Southam, Limited, will acquire and publish a newspaper in Winnipeg, Man.

The Ontario Government are considering the desirability of adopting a new series of school readers for the province. The contract for printing, with Warwick Brothers & Rutter, Toronto, has been extended for another year. This firm has done the Government printing for about twenty years.

For the first time on record, some of the New England paper mills have had to import pulp from Norway and Sweden owing to the low water and consequent scarcity of the home article in the Eastern States. A cargo of 8,000 tons of Scandinavian pulp arrived at Portland, Me., last month.

According to United States returns, our neighbors to the south exported to Canada and Newfoundland $900,774 worth of paper in the seven months ending January, against $789,054 in the same time last year. The same returns show that United States trade is increasing with South Africa and decreasing with Australasia. United States exports of paper to Great Britain increased from $1,073,385 in the seven months ending January, 1903, to $1,295,853, in the seven months ending January, 1904.

The Swedish Parliament, at its last session, imposed an export duty on wood pulp. This tax on exports amounts to 50 ore (about 13 cents) per ton on chemical pulp and 30 ore (say 8 cents) on mechanical pulp, dry, and half that rate on wet pulp. Apparently the idea is to deter the export of pulp and encourage the shipment of the finished paper.

For the seven months ending January, 1904, the United States imported from Canada wood pulp to the value of $1,059,768, as against $1,128,230 for the like period of 1903 and $735,765 for 1902. On the average of the past three years the United States took from Canada more than half the value of its total import of pulp. When estimated by weight, the United States imports are much greater from Canada than from all other countries combined. For instance, in the seven months ended January, 1904, out of a total import of 83,353 tons, 60,704 came from Canada; in 1904 it was 47,797, out of a total of 67,273, and in 1902 27,435 out of a total of 34,253. The United States imports of paper stock from Canada have also largely increased.

According to J. S. Larke, the commercial agent of the Dominion Government in Australasia, reporting on the preference which New Zealand has conceded to Britain and Canada, says it should be of benefit to Canadian paper manufacturers, including newspapers, wrapping paper and wall paper. One change in the new tariff does not take effect wholly at once. This is the duty on printing paper. On contracts already made it is to be suspended for three years, so that all paper already purchased abroad, for future delivery in New Zealand, will be admitted free of duty for three years. There is, nevertheless, an enquiry for Canadian paper now. It had previously been sold to some extent, and had the Canadian mills been prepared to undertake the trade, large contracts could have been secured. The chief trouble is

the freight charges. Though the Canadian Pacific Railway is giving low through rates, they are still higher than the charges on paper from Norway or the United States via New York. If Canada can secure the New Zealand trade, it would mean a freight of a thousand tons a month, and with other products would warrant a monthly steamer to start on.

The Maple Leaf newspaper office, Gilbert Plains, Man., was destroyed by fire last month.

St. John, N.B., is to have a new Liberal organ, the Daily News. A company of $100,000 is to be incorporated. C. J. Milligan will be manager.

C. A. Somerville, who has a pasteboard box factory in London, Ont., has established a similar industry in Stratford, Ont., employing 30 to 40 hands.

A half interest in the Galt, Ont., Paper Box Factory has been purchased by Geo. Hancock, Jr., who has severed his connection with the Grand River Metal Works.

A fire occurred last month in the Montreal Waste Paper Company's building, Montreal. The contents, consisting of bales of rags and paper, were ruined, and the interior of the building was badly damaged. Loss about $5,000.

Southern Nigeria has been added to the list of British colonies to which Canadian papers may be sent from offices of publication at the same rates as to places in Canada. This makes 26 British possessions that now admit Canadian papers at the domestic rate. Colonists and colonial institutions should understand that "now is the time to subscribe."

James A. Evoy, late of Kemptville, Ont., is publishing a new paper, the Carp Review and Carleton County Advertiser.

The Wallaceburg, Ont., Herald had to miss an issue on account of the blockade and scarcity of paper. The publisher says: "We could neither beg, borrow, buy nor steal a sheet in any of the surrounding towns, as the other offices were in much the same condition as we were, having only a week's supply on hand.

Forestry and Pulpwood

The Department of Forestry, at Indian Head, Assiniboia, will have upward of 2,000,000 trees for distribution. Persons wishing trees should make application at once.

Among the private bills recently assented to by the Lieut.-Governor of Nova Scotia is one to further amend Chapter 136 of the Acts of 1898, entitled: "An Act to incorporate the North American Paper and Lumber Company, Limited, and Acts in amendent thereof, and to change the name thereof."

Mr. Fleming, member for Carleton, N.B., has given notice in the New Brunswick Legislature of a motion to the effect that legislation should be at once promoted to prevent logs and other lumber which are grown and cut on Crown lands, being exported from the province in the round or unmanufactured state.

J. S. McLennan, Petersfield, Sydney, C.B., in a letter to the county council, calls attention to the preservation of the forests and woodland of the county. He states that 500,000 pieces of timber value $100,000, will be used in the mines this year. In 1894 only one-third of this quantity was used. If the present demand is not forthcoming and the mining companies have to go elsewhere, much money will be lost to Cape Breton. There are woods enough if they are not destroyed by ignorant cutting or fires. He calls attention to the north of Europe where forests, which have been cut 150 years, have to-day as much or more timber than ever, and suggests the adoption of the following rules: "Publishing through the county by posters full information as to the times when fires are prohibited; and the penalties for violation of the law. Calling the attention of roadmasters to the danger of allowing brush to remain on the roadside. By resolutions, and individually impressing upon the people of the country the duty of all citizens to take every precaution against the risk of damage by fire."

THE PULP CASES BEFORE THE UNITED STATES APPRAISERS.

The final decision of the United States Board of Appraisers at New York—so far as that board can make it final—on the Quebec pulp export cases, has been given out, and is what all expected. The pulp shipped to the United States and made from pulpwood taken from Crown lands in Quebec is dutiable at the ratio of 25 cents per ton extra, whether such pulp is manufactured in a mill in Ontario or Quebec. If the pulp is made from wood grown partly on Quebec Crown lands and partly on private lands, duty will be levied on such percentage only as is taken from Crown lands, but the onus of proof as to what that percentage is rests upon the importer. In the particular cases before the board, the judgment was as follows:

James MacLaren Company — dutiable, 40 per cent.; non-dutiable, 60 per cent.

Belgo-Canadian Pulp Company — No satisfactory evidence as to percentage. Entire importation liable to additional duty.

Brompton Pulp and Paper Co.—None liable to additional duty.

Jacques Cartier Pulp and Paper Co.—None liable to additional duty.

Laurentide Paper Co., Limited—Percentage of wood pulp dutiable, 68.6 per cent.; non-dutiable, 31.4 per cent.

Riordon Paper Mills, Limited—Dutiable, 98 per cent.; non-dutiable, 2 per cent.

Royal Paper Mills, Limited—Dutiable, 8 per cent.; non-dutiable, 92 per cent.

The clause in the United States tariff act of 1897, under which these cases fall, is as follows: "Mechanically ground wood pulp, one-twelfth of one cent per pound, dry weight; chemical wood pulp, unbleached, one-sixth of one cent per pound, dry weight; bleached, one-fourth of one cent per pound, dry weight; provided, that if any country or dependency shall impose an export duty on pulpwood exported to the United States, the amount of such export duty shall be added, as an additional duty, to the duties herein imposed upon wood pulp, when imported from such country or dependency."

It is said that the United States paper mills interested in the importation of Quebec pulp will support an appeal to the United States Supreme Court.

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ONTARIO GOVERNMENT PAPER CONTRACT.

The Riordon Paper Mills have secured the contract from the Ontario Government for the supply of printing paper for five years. Compared with the last contract, the price is $1,500 a year lower on a total of about $8,000. It includes fourteen samples and the following are the prices per ream, and the basis by which the prices are governed:

27 x41—55	$2.72
27 x41—55	2.53
27 x41—55	2.70
27 x41—55	3.02
27 x41—55	2.90
27 x41—55	2.43
27 x41—55	2.72
27 x41—55	2.75
27 x41—55	2.75
27 x41—55	2.05
27 x41—55	2.85
25½x30—46	1.85
25½x30—46	1.95
25½x30—46	1.82

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Personal

Mr. Warren, of Buffalo, N.Y., is now secretary of the Montrose Paper Co.

Geo. E. Challes, Toronto, is making a tour among the paper mills of the Western States.

C. A. Meincke, dealer in pulp and paper makers' chemicals, has been visiting the mills of Ontario. Mr. Meincke reports trade improving in Quebec.

A. W. Brunton, until recently buyer for the Canada Paper Co., at Windsor Mills, Que., has retired from that position and returned to Toronto, his former home.

John Craig, of London, Eng., brother of the president of the Imperial Paper Mills, of Sturgeon Falls, has visited Toronto in connection with the proposition to increase the capacity of the mills to 120 tons of paper per day. The present output of the mills is finding a market in Australia, Great Britain and the United States.

Frederick N. Ritchie has opened offices at 131 St. Peter St., Quebec, as an expert in timber inspection. Mr. Ritchie has had thirty years' experience in timber surveying and has high testimonials as to his knowledge of the value of timber limits. His local knowledge will make his services valuable to those wishing to select pulpwood and other timber lands.

Thomas Cole, a pioneer lumberman in the Ottawa Valley, died recently. Deceased, who was in his 83rd year was born in Devonshire, England, and came to Canada in 1820, about the time of the Papineau rebellion. The lumber and timber industry attracting his attention, he went to Montreal and from there along the Ottawa or Grand river to Papineauville, where he located and shortly after began taking out lumber on contract.

The death is announced of Alexander George Pirie, chairman and managing director of Alexander Pirie & Sons, Limited, Stoneywood, Scotland, the celebrated paper manufacturers. The deceased was born at Newhills, Aberdeenshire, in 1836, and educated at Rugby and Cambridge. From 1856 till 1869, Mr. Pirie took a leading part in the management of the great firm, and for a few years retired from active duty. In 1890, however, he resumed management of the business, and has also since acted as chairman of the company.

CAR BODIES FROM PULP.

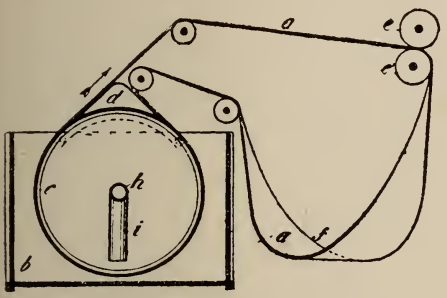
A New York electrical journal says electricians interested in the building of cars for the New York subways, are investigating a new material for car bodies the idea being to obtain a car not only fireproof, but also proof against vagrant electricity. The material is nothing more or less than wood pulp, but it won't burn, and under test it has proved wonderfully successful in resisting the electric current. The material is made up in planks or beams just like ordinary wood. It can be produced in slabs twelve feet by eight, and of any thickness required. In a test made at the Niagara Falls Power Co.'s plant, at Buffalo, it is stated the material was placed in circuit with a powerful current. A water rheostat recorded the resistance as the voltage was increased. A piece of the material yielded at a voltage of 28,000. The "yielding" was simply the passage of the current entirely through, making a hole of about the diameter of a pin, slightly blackened at the edges of the entering and emerging points. The material is wood pulp—the same that is used in the manufacture of paper. It is chemically treated by a process which is claimed to make it permanently fireproof. In manufacture it is subjected to a pressure of seventy tons to the square inch. It can be worked with tools, and a plane produces the smooth surface that follows its use on natural wood. The material can also be molded into curves of any segment or to any angle.

Judge Valin last month heard the application of the Imperial Paper Mills of Canada, Limited, for an order to erect a dam in the Sturgeon river at Sturgeon Falls, Ont., to obtain a thirty-eight foot head of water. The application was granted and disposition was made of the various claims arising out of land damages, etc.

The Riordon Paper Co.'s pulp mills, at Hawkesbury, are to start up again on the 1st April, and the company's Merritton mill is running again. S. A. & R. E. Lazier's mill has also started up again after a long shut down owing to low water and the heavy ice.

RECOVERING WASTE PULP.

Among recent foreign patents is one granted to Johannes Grondahl, of Baegna, Norway, for improvement in apparatus used in paper, cellulose, and wood pulp mills for gathering up the fibre in the water which runs off from the machinery. The inventor directs this



water to an apparatus comprising a movable endless felt, on which the fibres deposit, while the water passes through the pores of the felt. The fibres thus gathered on the felt are by suitable means removed therefrom and utilized, and the water is in this manner quite clear and free from pulp when it leaves the factory.

In the drawing, a represents an endless felt, b a tank, and c a cylinder constructed about as the cylinders in the usual cylinder machines. The felt is carried over this cylinder and over suitable guide rolls, as shown. The felt also passes between a pair of rollers, e e, where the pulp gathered on the felt is removed in the well-known way. Above the cylinder, which is perforated, as usual, on its cylindrical surface, is mounted a hollow bridge piece d. The latter is perforated on the faces in contact with the felt. The cylinder is journalled on a hollow shaft h, which has a downwardly projecting branch i, forming a connection through which the water gathering in the bottom of the cylinder may be removed. The cylinder turns freely on the said hollow shaft.

The bridge piece d serves to cover the upper part of the cylinder which is not covered by the felt, so that air shall not be sucked into the cylinder. As the cylinder rotates and the felt is moved with it in the direction of the arrow, pulp will be deposited on the felt and removed by the roll e or other suitable means. Some pulp may still adhere to the felt, and in order that this pulp shall not fill up the pores of the felt and make it less permeable for water, the inventor prefers to make use of a felt which is twisted, as indicated at f, in such a manner that the two sides of the felt are alternately utilized as a pulp gathering surface. The other side will then be cleansed from adhering pulp by the water passing through the felt.

PROCESS FOR COPYING PAPER.

Murray H. Chapin, of Bridgeport, Conn., has obtained a United States patent for improvements in paper and in methods of making it, for obtaining fast copies from writings of anilin inks. In making ordinary press copies a certain quantity of ink is absorbed by the tissue sheet—that is, ink is mechanically transferred from the original sheet to the tissue; but as this process does not involve any chemical change in the ink, the latter is very susceptible to the subsequent washing-out action of water.

"In seeking to attain the objects above mentioned," the inventor says. "I have discovered that it is possible at the time that the copy is being taken to produce a chemical union of the ink with the tissue, such that thereafter the copy cannot be materially affected by the action of water, and it is possible to cause a chemical union of the ink with the fibres of the original sheet, so that the original copy may also be rendered permanent—that is, not susceptible to being washed out by water and, like the tissue, not liable to fade materially under the action of light. The paper may be prepared by being passed through a bath composed of four hundred parts of water to one part of tannic acid, by weight. Sal-soda or any other suitable mordant or combination of mordants in proper proportions may be used, if desired, instead of tannic acid, which latter I have thus far used

successfully in practice. After the bath the paper may be properly dried and smoothed either by passing through heated rolls or otherwise. In practice the copying-tissue may be passed through the mordant bath from a continuous roll and after being dried and smoothed may be cut up into sheets and formed into a press copy-book in the ordinary way. The described chemical action will then take place during the press-copying operation, both in the prepared tissue and also in the original sheet. As the mordant will allow only a certain amount of the anilin coloring matter to be taken up from the original sheet, blurring of the latter and of copy is to a large extent avoided. Hence there may be considerable variation in the degree of dampness of the copying-cloth without injuriously affecting either the copy or the original, which has not been the case heretofore. Paper may be otherwise subjected to a mordant treatment either during the manufacturing process or subsequently without departing from my invention, and in some cases the paper to receive the original type impressions may be provided with a mordant instead of the press copy-paper."

NEW DIGESTER LINING.

Among the patents recently issued in the United States is one to George Lanzendoerfer, of Boston, for a new digester lining. The invention consists in a digester which has a metal shell of the usual type, and which is lined upon its interior with acid-resisting bricks of a curved shape, having plain outer faces and deeply corrugated inner faces, the corrugations forming receptacles or pockets for a cement used in uniting the bricks to the shell and to each other. This provides a structure in which the bricks may be set directly against the shell, or bricks carried thereby, and in which the joints between the bricks, and the shell, and the individual courses of brick are formed by a series of rings or sections of cement arranged between the bricks, and so as to, in effect, produce as many different joints and variety of joints as there are rings, the purpose of the invention being to provide a structure which shall offer the greatest resistance to the strains to which a digester lining is subjected, and shall also offer under such conditions the least liability of the escape of the liquid of the digester from the lining to its shell or casing.

Figure 1 is a view of a portion of a digester looking from the interior

Fig. 1.

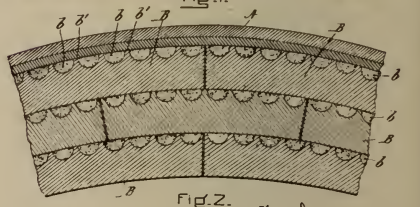


Fig. 2.

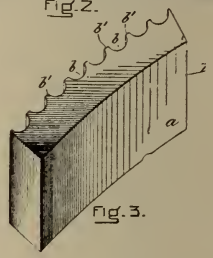


Fig. 3.

thereof. Fig. 2 is a detail view in section, enlarged, and Fig. 3 is a view in perspective of one of the bricks. Referring to the drawings, A represents the usual type of digester shell or casing. It may, or may not, be lined upon its inner surface with lead or other acid-resisting substance. To the inner surfacing of the shell or to the lining, if one be used, there is then applied the bricks B, in as many courses as may be desired. The bricks are alike, and each is curved to conform to the curvature of the shell, and has a smooth curved surface a, and a corrugated back b, the corrugations extending crosswise the back and being relatively wide and deep, and separated by relatively narrow intervening parts b

of the brick back, which are substantially of the same size, and the outer edges of which are arranged upon the same curve. These bricks preferably have flat sides and ends, the ends being somewhat inclined as represented. The bricks thus shaped will form, assembled together, a wall of the curvature of the digester wall.

As many courses of brick may be used as desired, the first course being against the wall of the digester shell and the next course against the first course of brick, and so on. Each course is united to its support, whether digester casing or brick, by means of cement applied to the corrugations to fill the same and to bear against the support, the beds of cement thus held in the corrugations acting as so many bands to unite the courses of brick to their supports as well as to provide a series of independent joint-sealing packings between the courses. The joints between the sides and edges of the bricks are sealed in any desired way.

Because of the corrugations in the bricks, which receive the cement, a larger surface for the adhesion of the cement to the bricks is provided than where the surface is straight, while, on the other hand, sections of the back of each brick are brought into contact with its support, thus breaking the continuity of the cement and causing a structure which consists of alternate bodies of cement and brick.

"The employment of the cement in this manner," says the inventor, "not only effects a structure of the character indicated, but it also furnishes a large number of independent cement joints, which, because of their independence, provides an improved construction, in that a crack or defect of any kind in one joint is confined to that joint, and does not extend to other joints, so that an imperfection in one part of the cement is confined to that, and a very narrow one, and does not necessarily extend to another, and the joints thus act to correct each other's possible defects, and thereby forms a multiplex, uniting and packing backing, through which the liquid cannot be forced to the shell. The bricks are also of some importance in that they can be assembled or built in the arch of the digester, without the use of temporary or false supports."

NEWFOUNDLAND WOOD INDUSTRY.

The St. John's Herald, Newfoundland, reporting on the wood industry for 1903, says: "Few of our industries have made such rapid strides as lumbering. Five years ago, if it was stated that the colony could export 50,000,000 feet of lumber per annum, the statement would be ridiculed, but yet that stage of development in using up our forest wealth has been reached this year. The largest individual operator is the "Timber Estates Coy." This concern has six mills, and their total output will be some 25,000,000 feet. The cut of the New Land Co., with mills at Norris Arm and Notre Dame Jcn. will be about 8,000,000 feet. At the former site they have erected a mill with a capacity of 100,000 feet daily. The Timber Estates Co. will cut 50,000,000 feet next season, and will employ 1,200 men in the woods this winter, making a total of 1,700 for the two companies. The pine has been graded by Ottawa Valley cullers, and yields over 10 per cent. of clear (without knots) deal, selling on an equality with the Ottawa river product—the finest in the world. The spruce and fir are also excellent stock and fetch as high prices as are paid for these species of wood. The Botwoodville Mill, recently purchased by George J. Barker, of Boston, Mass., has cut 8,000,000 feet this year, and he will double this next year. Already his company have shipped a cargo of spruce, the first we understand, ever sent to the United States from Newfoundland. The depletion of the spruce areas in the Eastern States by the pulp-makers leaves the market short of this grade of wood, and there will be a big demand for our product henceforth. On the west coast Willis & Howard have cut between 2,000,000 and 3,000,000 feet, making with

smaller quantities a total cut this year for the colony of 50,000,000 feet. At $10 a thousand, this represents a total valuation of $500,000 worth of lumber shipped during the present year, whereas five years ago we were importing, instead of exporting, forest products."

MECHANICAL WOOD PULP.*

By Stanislas Gagne, B.A., Sc.

(Continued from last issue).

THE MECHANICAL PROCESS.

The aim of this process is likewise to produce cellulose fibres for paper making, but being purely mechanical the whole solid substance of the wood except the bark is ground into pulp. As we have seen, spruce for example, contains only 53 per cent. of cellulose fibres, hence, mechanical pulp made from spruce can only contain 53 per cent. of paper making fibres, the rest being called the cementing material which is mainly lignin. This is the reason why paper partly made of mechanical wood pulp, such as newspaper for example, discolors when exposed to the light for some time.

Again, as the wood is ground on stones, we have the pulp in the form of minute chips and not as individual fibres as in the case of the chemical processes. Therefore this process gives a very different result from the others described, which places it in a class by itself. It is not, however, a rival to them; each kind having its own use. It is the direct object of the manufacturer in every case however to get as nearly as possible a fibre pulp, a fact on which depends the value of his product.

WOODS EMPLOYED.—Spruce, especially the black variety, owing to its tough fibre and also for the other reasons mentioned, is mainly employed. Fir or balsam are also used from 5 to even as high as 40 per cent., with spruce as stated. When ground its weight is less than spruce, and consequently more wood is required to produce a ton of pulp, and it is more bulky when baled. When resinous it adheres to the stones, chokes the screens, clogs the cylinder and the felt of the wet machines, causing irregular sheets and general trouble everywhere in the process. Poplar (aspen) when ground makes a fine white and smooth grade of pulp, but as the supply is nearly always limited, its use is also limited. Spruce and poplar or aspen make a good combination, spruce lending its strength and poplar its firmness to the pulp. The methods of cutting and bringing wood to the pulp mills are the same as in the case of ordinary saw-mills, the only exception being that all the wood of a tree is utilized save the branches; in some cases logs as small as three inches in diameter are brought to the mill as the size of the blocks is really of not much importance. Figure 10 illustrates the general principles adhered to in the building of a pulp mill. No definite rule is offered for the arrangement of the machines, each individual site having its own peculiarities.

POWER.—All mechanical wood pulp mills in Canada are situated on some water course or stream from which the necessary power is derived, and in most cases, on which the wood is floated to the mills. As a rule steam power cannot be used for this purpose on account of the large amount required as a consequence of the great variations of the load, and its cost. A water fall, natural or artificial is the only source of power than can be utilized for a pulp mill. An ordinary grinding machine producing 5 tons of pulp (dry) per 24 hours, requires about 350-h.p., and an additional 25 will drive the rest of the machinery for those 5 tons, therefore 75-h.p are necessary to produce one ton of pulp (dry) in a day. As it is not the purpose of this paper to discuss the methods of utilizing a water-power, and the means of getting the highest power from a given fall, a

*The above paper won the first prize given by the publishers of the Pulp and Paper Magazine for the best student's paper presented to the Canadian Society of Civil Engineers for 1903, the judges being members of the Society.

few remarks concerning the requirements of the process will be sufficient. A dam or canal, or perhaps both are built, and from there a penstock, flume or pipe line conveys the water to the turbines or water-wheels. The types of these wheels are governed by the height of the fall (the usual practice being to use reaction turbines for low heads and impulse turbines for high heads) by the variations in the volume of water available and by the work that is expected of them. As will be seen later, some such speed as 175 to 250 R.P.M. is required, and this ought not to vary when part of the load is taken off, as when pockets of the grinders are being filled, thus relieving the pressure on the stone. To attain this result, governors are sometimes employed, specially when wheels drive only one or two grinders each, for then, one pocket opened means 1-3 or 1-6 of the load suddenly taken off, and in such cases the turbine will increase in speed according to its construction if no governor is attached to it; but the cost, great wear, frequency of repairs and losses of time, occasioned by these causes most manufacturers to do without them if they possibly can. As will also be seen later pumps are sometimes used to act as governors but as their use, as such, means a different grade of pulp at different times they are unsatisfactory for this purpose. The best means of getting over the difficulty seems to be to couple on one pair of turbines, turning both in the same direction relative to their common shaft, as many grinders as possible. If a pair of turbines are thus attached to each other as in the case of Fig. 10, the friction on the end bearings will be eliminated, thus increasing the efficiency, and if these are made of the largest possible power several grinders are coupled to that pair, and in that case the variation of the load is smaller. In some cases turbines may be built so that variation of speed will be small compared with certain variations of load, thus dispensing with governors. Again turbines may be designed for a given speed when some of the pockets of the grinders are idle, and in operation, when the pressure is relieved from one pocket,

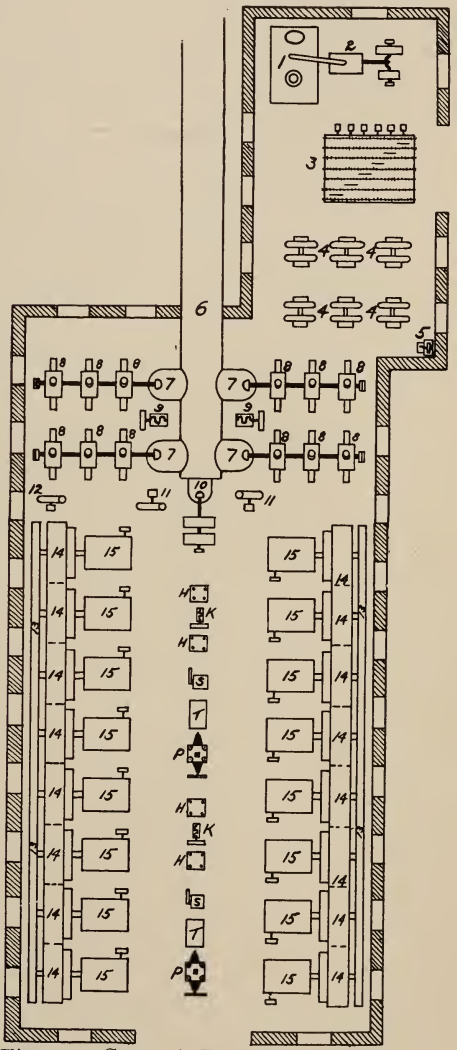


Fig. 10—General Plan of a Mechanical Wood Pulp Mill.

Explanation: 1—Steam Boiler. 2—Steam Engine. 3—Sawing Machine. 4—Barking Machine (in pairs). 5—Splitting Machine. 6—Water Flume. 7—Turbines and Casings for same. 8—Grinding Machines. 6—Pressure Pumps. 10—Casing and Turbine for general work. 11—Stuff Pumps. 12—Low Pressure Pump. 13- Troughs. 14—Screens (Vibrating Type). 15—Wet Machines. H—Hydraulic Presses. K—High Pressure Pumps. S—Scales. T—Tables. P—Packing Presses.

the same pressure is automatically applied on another one, thus keeping the load, and thereby the speed constant.

Therefore the problem is this: Given a certain head and volume of water, to get a turbine that will give a good efficiency at a given speed, and that speed not to vary much with certain variations of the load. To fulfil these requirements, it does not do to get any turbine whatsoever because of its low prices or other such considerations.

Handling logs.—To maintain proper order in this description of the mechanical process we shall start with the wood as it arrives near the mill, i.e., where lumbering operations proper end, and follow it through the different parts and machinery of the process. If logs are floated down the river, they are kept in a boom above the mill dam from

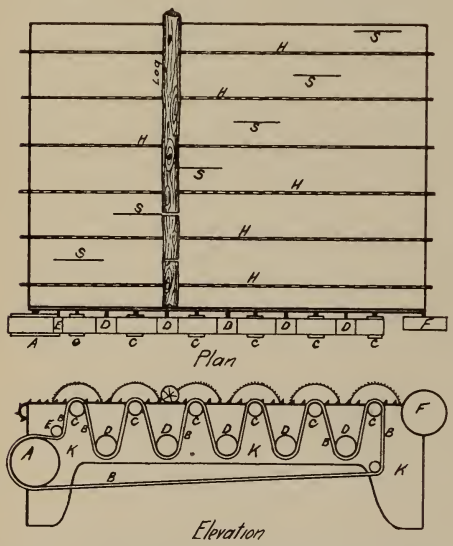


Fig. 11—Principle of a Pulpwood Sawing Machine.

Explanation: A—Driving Pulley. B—Driving Belt. C—Saw Pulleys. D—Tightening Pulleys. E—Tightening Pulleys. F—Conveyor. K—Frame. H—Chain Conveyors. S—Saws.

which they are taken to the cutters by means of a slide, chain conveyor, and log jack, or a similar arrangement depending on the nature of the ground relative to the mill. If brought by cars they are dumped near the mill where some arrangement such as an endless chain distributes them to the cutters. A similar device is used if the logs are brought from the river below the mill or taken from the piles of the winter supply which have been laid on skidways at the fall before the river was frozen. One of the rules that should be observed in handling logs is to keep them out of contact with the ground as much as possible, because sand and dirt will occasion trouble when they are sawn and barked. The wood should also be employed as green and wet as possible, because the grinding operation is thus facilitated and the pulp is of a higher grade as the fibres are more flexible and not so hard to detach from each other.

Sawing.—The logs are cut into lengths regulated by the size of the pockets or the grinders, usually 24 inches, though some use as small as 16-inch lengths. For mills of a small capacity, say up to 30 tons per day a swing saw is generally considered a good arrangement, especially when logs are from 10 to 14 feet long. If the logs are brought to the mill in 4-foot lengths (cord length), a cradle saw is sometimes used, where logs are put on a cradle which is swung unto the fixed revolving saw. One of the best machines for sawing these blocks, when the mill has a large capacity and output, is that represented by Figure 11. In that case each saw is on a separate shaft and all these saw shafts are driven by the same pulley and belt. Logs are driven across the table by endless chain conveyors, and in this way only one saw is cutting a log at a time. If more than one saw is made to cut a log at one time that log is liable to jam between the saws, damage them and fly out, especially if three saws or more are used. By this method, illustrated in Figure 11, when a log has passed across the whole table it is all cut up into the required lengths which fall near by, or are conveyed to the barkers.

Barking.—The type of barker most frequently employed is that represented by Figure 14. It consists of a disk about 52 inches in diameter in which 4 knives are so set as to cut a thin slice off the wood stick at a time. That disk is surrounded by a cast iron frame

open to give access to the knives, and a table to support the wood is attached to it. The bolt or stick is pressed against the revolving knives and the bark and chips, falling behind the disk, are blown by fans acting like a centrifugal pump, through a pipe to a convenient place, usually to the boiler to be utilized in steam generation. The wood is usually pressed and revolved against the cutting knives, by hand. Various arrangements (such as the one represented in cut), have been invented to revolve the wood automatically against the knives, but the writer is doubtful if such a plan is useful and economical. The speed of revolution of the stick, in these automatic revolving appliances, depending as it does on that of the knives, they ought to do good work and save labor if the bark is of uniform thickness, but in cases where logs are brought long distances by water and through rapids, the thickness of the bark is very irregular, and in fact, parts of the stick have no bark at all; hence if these sticks are put into an automatic revolving apparatus some good wood will be cut unnecessarily whereas if revolved by hand the bark only will be cut away. The capacity of an ordinary barker running at about 600-R.P.M., is usually from 6 to 10 cords a day, varying with the skill of the operator.

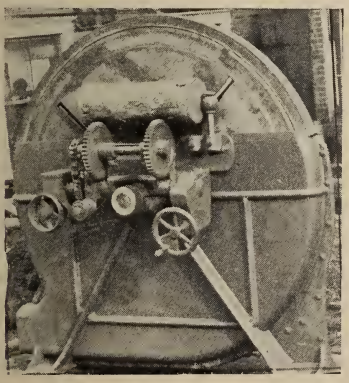


Fig. 14.—Pulpwood Barker (Sherbrooke Iron Works.)

Splitting.—When sticks are too large to enter conveniently into the pockets of the grinders they are split by hand or by a machine such as represented in Fig. 16. In these cases, which frequently occur, where pulp mills are provided with a carriage and saw for turning large logs into lumber for the market instead of utilizing them to produce pulp, little splitting is required after barking. It is usually found convenient to have the sawing, barking and splitting operations all performed in a separate building as shown in general plan, Fig. 10. Power for this purpose may be derived from one of the turbines or from a steam engine, the bark and small butts being used as fuel. From the barkers the wood is conveyed to the grinders.

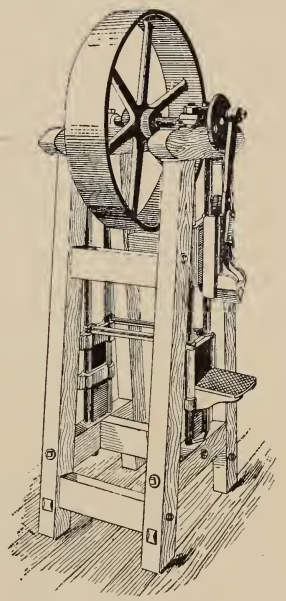


Fig. 16—Wood Splitter.

(To be continued.)

ST. GEORGE'S PULP AND PAPER CO.'S NEW MILL.

We are now able to give a brief description of the new pulp mill and power plant of the St. George Pulp and Paper Co. at St. George, New Brunswick.

Situated on an inlet of the Bay of Fundy, and about twenty miles from

the international boundary between Maine and New Brunswick, is the town of St. George, with a population of about 1,500. Through this town flows the Magaguadavic River, the outlet of more than eighty lakes. At St. George, where the Magaguadavic River empties into the Bay of Fundy, there is a natural waterfall of forty-five feet to high tide. For a great many years this magnificent power has remained practically undeveloped, its only use being to furnish power to four granite mills. These mills used the water under a low head, and, of course, wastefully.

About three years ago the attention of New York parties, who were looking for a site upon which to build a pulp mill and electric power plant, was drawn to this spot. It was found that by the erection of two dams, each about 120 feet long and 20 feet high, in connection with a steel penstock 16 feet in diameter and 500 feet long, a mill could be built at tide water and power developed to the extent of upwards of 5,000 horse power. On the Magaguadavic River and its tributaries were vast tracts of valuable wood lands, principally spruce, but with a goodly quantity of pine, hemlock and cedar. It appeared evident to these parties that here, with good facilities for shipping their product, either by rail or water, was the ideal location for a plant such as they intended to erect. With an open port ten months in each year, the advantages of this location, as compared with mills situated several hundred miles inland is readily apparent. The whole of the power at St. George was acquired after timber lands had been secured of an aggregate area of over fifty square miles. This timber is all situated on the lakes and streams tributary to the Magaguadavic river. The company now owns sufficient land to ensure a constant supply of logs for its mill for a period of more than twenty-five years. It also owns and operates a steam sawmill, where lumber, lath and shingles are manufactured.

The erection of the dams and mills was commenced in June, 1902 and the work completed about a year later. 2,800-h.p. is the present development, but by the addition of more turbines this can be increased to 5,000-h.p. In addition to the pulp mill proper, there has been installed a generating plant which is furnishing electric power to the four leading granite cutting and polishing mills, as well as for the cutting-up mill used by the company in the preparation of the wood for the pulp grinders. The pulp mill has been in operation for the past six months. A very superior quality of pulp has been produced from the start and although the company has been able to operate its mill to its fullest capacity, it has been impossible to supply the demand for pulp and orders are now booked for the entire production of the mill for several months to come. During the present winter while a scarcity of water for power has been the cry from all parts of Canada and the Eastern States, there has been an abundance of water at St. George, and with all the mill running full head there has been a good quantity of water flowing over the dams.

Contrary to the experience of some other pulp manufacturers in Canada, the St. George Pulp and Paper Co. has been remarkably successful. Owning as they do their spruce timber, which they can cut and drive to their mills cheaply; with a modern mill capable of turning out the finest quality of pulp, and with their own wharves, where vessels may be loaded within 300 ft. of the mill, it is difficult to find another pulp mill as favorably situated.

The surplus power at St. George can be transmitted electrically to St. John and other cities to be used in the operation of street railways, for lighting purposes, etc. It is rumored that the company now has plans under consideration looking toward this end.

The mill, which is simple in design, is a single story brick building with truss roof, heated by steam and lighted by electricity. The water from the water wheels is discharged over a spill-way wall at the high-tide level, so that the

wheels is discharged over a spill-way given a uniformity of speed at all seasons of the year. The officers of the company are all practical men of life-long experience in the pulp and paper business. They are as follows: Joseph Goodfellow, Fort Edward, N.Y., president; E. G. Murphy, Sandy Hill, N.Y., vice-president and general manager; E. W. Murphey, Albany, N.Y., secretary and treasurer.

SHAWINIGAN POWER.

Editor, Pulp and Paper Magazine:—

Sir,—An article appeared in the January issue of your magazine, entitled: "Scandanavia vs. Canada." The writer of this article in referring to the Belgo-Canadian Pulp Co., whose works are situated at Shawinigan Falls, Que, states that this pulp company is hampered in its operations by being "under the thumb of the Shawinigan Water and Power Company." We decidedly object to this statement, as it is not justified by anything in the relations existing between the Belgo-Canadian Pulp Co. and ourselves. On the contrary, the relations are most satisfactory to all concerned. You may not understand that the Belgo Co. operates from water-power which is distinctly separate from our main development, and was built especially for their purposes and is operated by them. The character of this power, you will realize when we state that while other mills have, during the present season been hampered by failure of power, the Belgo Company, on the contrary, have never for one moment had to curtail their capacity and have been able to operate in full during the entire season. It would be poor policy for this company with its large power to be developed in the future, to adopt such measures as would restrict the development of our lessees' properties. On the contrary, it is our desire to in every way facilitate their successful operation. Of course, such statements as were published in your issue of January have their foundation in a source regardless of the facts. We would appreciate your correcting the false impression which might arise from this article.

Very truly yours,

J. E. Aldred,

Treasurer, Shawinigan Water & Power Co.

[The article referred to was quoted from the Paper Maker, of London, and was quoted for the sake of its advice to Scandinavian pulp manufacturers.—Ed.]

BIG SIZE OF HAND-MADE PAPER.

The calendar of the Paper Makers' Association, of Great Britain, for 1904, records a size of a hand-made paper known as "Emperor," 72 by 48 inches. No one in the trade seems to have any idea of such a size being made, even going back a century. In "A Practical Guide to the Varieties and Relative Values of Paper," by Richard Herring, published in 1860, it is stated that "the largest paper now made by hand, which is termed Antiquarian, measures 53 by 31 inches, and so great is the weight of liquid pulp employed in the formation of a single sheet, that no fewer than nine men are required besides additional assistance in raising the mould out of the vat by means of pulleys."

The author of this book states that "the earliest trace of the manufacture of paper in England occurs in a book printed by Caxton, about the year 1490, in which it is said of John Tate:

Whict late hathe in England doo make
thys paper thynne,
That now in our Englyssh thys booke
is prynted inne."

His mill was situate at or near Stevenage, in Hertfordshire, and that it was considered worthy of especial notice is evident from an entry made in Henry VII's Household Book, on the 25th May, 1498: "For a rewarde geven at the paper

mylne, 16s. 8d." And again in 1499: "Geven in rewarde to Tate of the mylne, 6s. 8d."

PAPER THAT WILL NOT SHRINK OR SWELL.

A paper that is tough and pliable and will not shrink or swell is the aim of E. H. Fowler and D. N. Hoover, of Washington, who have obtained a British patent. This invention was briefly referred to in our October number, but the process is disclosed in general terms in the patent.

After speaking of the swelling of ordinary paper when dampened for printing, the inventors go on to say: "Also after the completion of the printing process when subjected to atmospheric changes, the paper expands or contracts, as the case may be, which also causes a distortion of the impression. This is very objectionable in the printing of charts, maps and other work in which it is desired to have the impression remain unchanged and to conform to the original imprint. In maps and charts, for an instance, the impression on the dried paper becomes so changed and distorted as to render scale measurements inaccurate and unreliable. Under our invention, this objectionable feature is avoided, as the paper does not have to be wetted preparatory to printing and does not expand or contract.

"To obtain the results we have in view, we treat the paper with a solution of glycerine and alcohol. This is done either by introducing the preparation into the paper during any stage in the process of the manufacture of the same, or by impregnating the finished paper in its dry state with the solution. In practice we have found that good results are obtained by a solution of about sixteen pounds of chemically pure glycerine, two gallons of grain alcohol, 95 per cent. pure, and one gallon of distilled water applied to 100 pounds of finished paper. The solution can be applied in various ways—for an example, by passing the paper between rolls coated with the preparation. The proportions of the ingredients may be varied according to the treatment and the quality and kind of paper used and the result desired. Also different kinds of alcohol may be used.

"Attempts have been made to accomplish the above purpose by treating paper with glycerine dissolved in water, but without much success. In most paper there is more or less resin and wax adhering to and in combination with the individual fibres composing the fabric. The resin and wax repel water, and as there is a close affinity between water and glycerine, the latter is prevented from becoming immediately associated with the individual fibres, owing to the repulsion of the water by the wax and resin. The solution of glycerine and water only enters and remains in the larger interstices between the fibres.

"Alcohol is not repelled by the resin and wax, but, on the contrary, dissolves them readily and penetrates the fibres and carries the glycerine with it, so that the latter becomes immediately associated with the individual fibres. After the alcohol has served its purpose as a conveyor for introducing the glycerine into the fibres, much of it evaporates, but some may still be held by the glycerine. The latter also holds much of the water of the solution, and if any should be lost by evaporation it absorbs additional moisture from the atmosphere should the paper become exposed to agencies to cause the water to evaporate. As the glycerine is immediately associated with the individual fibres of the paper, and as it always holds considerable water and perhaps some of the alcohol of the original solution, the condition of the fabric will remain practically constant. Its condition will always be such as to readily receive impressions in printing processes without a preparatory moistening. Consequently the impression it first receives will not have its dimensions changed by subsequent shrinkage or expansion. Also as the glycerine always holds a certain amount of water the

paper will not be liable to change when subjected to atmospheric changes. The inventors claim that paper so treated retains its original strength and pliability. These claims will of course have to be tested by time.

PULP AND THE DAILY PAPER.

(London Daily Chronicle.)

Wood pulp is one of those commodities difficult to classify for it is both a manufactured article and a raw material. Mr. Chamberlain has been graciously pleased, however, to consider it a raw material, and it will consequently continue to have a free entry into this country, whatever fate may befall foreign paper—an article which is just as much the raw material of newspapers and printers as pulp is of paper-makers. Some 550,000 tons of pulp are imported into this country every year, and it is largely owing to a plentiful supply of this material at a cheap price that a half-penny "Daily Chronicle" is possible. But not entirely to this, for machinery in the paper mill plays its part, and has advanced with rapid strides in the direction of economy and progress. Not very long ago 150 ft. per minute was considered a fast speed at which to produce paper. But now paper double the width is turned out at a speed of 450 ft. to 500 ft. per minute, with very little extra cost of labor, in the paper mills of "The Daily Chronicle."

Then the setting up of type by hand has given place to type-setting by machinery, at an infinitely faster speed; and the printing of a newspaper, such as this, is now done at the almost incredible speed of 50,000 complete copies per hour for each press. When a dozen presses are at work, as is the case of "The Daily Chronicle,"' some idea may be conceived of the scale upon which these things are done.

But just as we hear warning that our coal supply is giving out, so we are continually reminded that the fearful inroad now made upon the forests of Scandinavia, Canada, and America will sooner or later end in their total depletion. Undoubtedly the drain upon them is very great, and planting is not keeping pace with the cutting. Germany already feels the pinch, and so does America. Big as the forests of the United States have been, they are rapidly disappearing before the axe of the woodman, and the fire of the incendiary; and American paper mills are drawing upon Canada for their supplies of timber to a most alarming extent. Happily, the importance of replanting is being more and more recognized by the Governments concerned. In Norway the school children are allowed a half-holiday once a week to go out and plant trees—a system which serves the double purpose of afforestation and of instilling into the youthful minds the value of this great national asset. And in many of the States Arbor Day, or tree-planting day, is carefully observed; while better forest laws are being brought into operation to safeguard this great natural wealth.

While all these things combined make a half-penny morning paper to-day possible without decrease in size, he would be a bold man who would say that in view of the rapid depletion of the world's stores of timber, such a thing can be absolutely permanent. Anyone who considers these matters is staggered by the prodigal wastefulness of paper which goes on. How much of the output of the present day press is absolute waste, so far as enlightenment, edification or amusement is concerned, it is impossible to say. Very many tens of thousands of the much-boasted "largest circulations" find their way to the paper mills to be repulped.

CANADIAN FORESTRY ASSOCIATION.

The fifth annual meeting of the Canadian Forestry Association was held in Toronto on the 10th and 11th inst., the president, Hiram Robinson, of Ottawa,

in the chair. Among those present were E. Stewart, secretary, Ottawa; R. H. Campbell, assistant secretary, and treasurer, Ottawa; Prof. A. H. Unwin, of the Dominion Forestry branch, Ottawa; J. M. Macoun, of the Geological Survey, Ottawa; Norman M. Ross and J. W. Wardrope, Ottawa; Wm. Little, F. G. Todd, Montreal, and W. J. C. Hall, of the Department of Lands and Forest of Quebec; Prof. Filibert Roth, of the College of Forestry, University of Michigan; E. G. Joly de Lotbiniere, Quebec; Prof. W. L. Goodwin, and Geo. Y. Chown, Kingston; Rev. A. E. Burke, Alberton, P.E.I.; D. James, Thornhill, Ont.; James Gillies, Carleton Place, Ont.; H. Silverthorne, Summerville, Ont.; E. J. Zavitz, New Haven, Conn.; Thos. Conant, Oshawa, Ont.; M. Hoehn, Berlin, Ont.; D. J. Cooper, Collingwood, Ont.; Professors Hutt and Reynolds and H. S. Peart, Guelph, Ont.; John Loudon, president Toronto University; Aubrey White, assistant Commissioner Crown Lands, Toronto; Thomas Southworth, Director of Forestry, Toronto; Hon. J. E. Evanturel, John Bertram, S. S. Cann, T. S. Young, J. J. Bell, E. B. Biggar, and others, of Toronto.

The report of the board of directors showed that the membership had increased from 400, in 1903, to 479, in 1904. The receipts were $1,117.96, and the expenditure $395.80, exclusive of $200 for subscription to Rod and Gun. The Ontario Government had granted $300, and that of British Columbia $200 towards the Association. The report referred to the destructive forest fires of last year, and placed on record the opinion that these fires would have been much worse had it not been for the work of the fire ranging staff. This staff, however, is still inadequate to protect the great forest areas. The experience of the past showed that the risks of forest fires were greatly increased by railway building in forested districts, owing to the carelessness of contractors, and the Government was advised to take action to prevent such fires during the construction of the Grand Trunk Pacific and other roads through the northern forest districts. Forestry legislation had been advanced in Ontario by the addition to the Temagami reserve of a tract of 3,700 square miles, increasing it to 5,900 square miles, and the creation of a new reservation of 3,000 square miles or 1,920,000 acres to the north of Lake Huron. The policy of the Ontario Government is that in these reserves timber should be disposed of by the thousand on the stump and should be cut under the supervision of officers of the Government.

In Nova Scotia, an act has been passed providing for the establishment of a fire-ranging system. As in that province the forest lands have largely passed into private hands, the system is based on the appointment of fire wardens for the counties, the larger forest areas in such divisions to assist in the payment of the service by means of a special tax. The interest of the municipal authorities in forested districts in the prevention of fires is a desirable object, and it might very well be made a subject of special study by the Association.

The operations of the Dominion Forestry Branch, in connection with the tree-planting scheme, have shown steady expansion. In 1901, the first year of operation, 18 settlers were supplied with 63,780 trees, and for the present year, 1904, 1,030 settlers will be supplied, 1,700,000 trees having been provided for this purpose. The total distribution, including 1904, will be 3,210,467 trees and 1,518 lbs. of seed to 2,064 settlers. It is estimated that the applications for the year 1905 will reach the number of 2,300.

A recent estimate of the area of timber reserves under control of the Dominion places the figures at 15,135¾ square miles, or 9,686,880 acres, 3,449,600 acres being in Manitoba, 5,612,800 in the North-West Territories, and 624,480 acres in British Columbia. A decision has been reached to open the Rocky Mountain Foothills Timber Reserve to disposal under license. As this reserve controls the water supply of a large part of Southern Alberta, where irrigation is necessary for successful agriculture the

conditions are unique and the administration of this reserve should not be carried out on the same principles as are adopted in connection with other tracts. Licenses should certainly not be granted without an inspection of the limits and there should be such supervision of the operations as to prevent injury to the water supply whether through increasing the danger from fire or otherwise. The secretary and assistant secretary visited Nova Scotia and New Brunswick, and as a result an increased interest is being taken in the subject of forestry there.

The report also referred to the question of an official organ for the Association and the advice of the meeting was asked. At a later stage this matter was fully discussed and referred to a special committee, which recommended that a bulletin be established as a medium of disseminating information to the press and public. The committee's recommendation was adopted.

F. G. Todd, of Montreal, read a paper on "Native Trees and Their Use in Ornamental Planting." He had a good word to say of the red oak as against the horse chestnut for street planting. The birch, especially the canoe or river birch, was invaluable for parks, as it was long-lived and easy to grow. Among the evergreens the white and black spruce, the fir, the hemlock, and cedar were recommended; while the author had a special admiration for the Ailanthus or Chinese tree of heaven, which was a flowering tree with pinnated leaves like the sumach and grew to a height of 70 or 80 ft.

Prof. A. Harold Unwin, of the Dominion Forestry Branch, read a paper on "Forest Reproduction in Germany." From this it appeared that the forests of Germany, which occupy 25 per cent. of the total area of land (Sweden has 48 per cent. and Finland 62 per cent.), are composed of trees belonging to the same genera as our own, only represented by different species. The chief of these are spruce (Picea excelsa), the Scotch pine (Pinus sylvestris), the fir (Abies pectinata), like our balsam but growing much larger (up to 150 feet in height and 6 feet in diameter), the larch or tamarac, as it is termed here. Then of the broad-leaved trees, the beech (Fagus sylvatica), the oak (Quercus pedunculata and sessiliflora), corresponding to white and burr oak here (Quercus alba and macrocarpa), great maple and Norway maple (Acer pseudo-platanus and platanoides), corresponding to the hard maple and soft maple here, oak (Fraxinus excelsior), like white ash (Fraxinus americana), elm (Ulmus montana) like white elm (Ulmus americana), silver birch (Betula alba), corresponding to white birch (Betula papyrifera). One important tree, especially here, which has not an exact counterpart in Europe, is the yellow birch (Betula lutea). Of these trees the Scotch pine occupies 41 per cent. of the total forest area; Norway spruce, 22.5 per cent., making, with larch, etc., two-thirds coniferous forest and one-third of broad leaved trees. Originally the composition was somewhat different, the pine and beech and other hardwoods occupying a greater and the spruce a comparatively smaller area. Although the original growth determined to a great extent the system of forest exploitation and reproduction, this was modified by a far-sighted commercial policy of selecting those trees for special care the price of whose timber was rising most in value. An early indication of this was shown as the following table will illustrate:

*Per centual rise in price (large timber) (1875 = 100).

In	1745.	1761.	1797.	1867.	1875.	1882	1890.
Beech, maple and oak....	14.67	26.67	36.00	64.00	100.00	100.00	120.00
Birch	....	....	....	....	100.00	100.00	116.67
Spruce	7.14	31.43	48.56	68.57	100.00	107.14	135.71

*The History of the Stolberg Wernigerode Forests, by V. Cube.

That is to say, in 1745 beech was double the value of spruce. Forty years later that was almost reversed. Then the two rose in value in similar proportion, but the spruce being the quicker growing tree was planted more extensively. In 1867 they both rise, but the spruce has a tendency to increase in price quicker. Then in 1875 they are both equal, and finally in 1882 and 1890 and at the present time the price of spruce at $28 per thousand in the wood and beech, $18 clearly shows the difference. Beside that as soon as public men realized this and guided by the advice of the then half foresters and half huntsmen of the nobles, rational, conservative commercial forestry was inaugurated. Previous to that, that is, in the 18th century, cutting had been quite haphazard. Definite plans were made showing exactly what could be cut on certain areas permanently without endangering the existence of the forest. Diameter limits were at first used or rather trees of a certain size. Now, this manner of using the virgin forest or growing timber trees is not only German but is also "german" to all countries where forestry is practised. It is, in fact, the essence of forestry, as with a moderate climate, such as ours, a forest will reproduce itself and better still and more quickly if slightly assisted with the help of a few seed trees on each acre. This principle of cutting a forest with regard to getting a regular and annual yield has been kept up from the start both where planting had to be done to restock the cut areas and also where the forest could be left unassisted to reseed itself. And it is to this that the splendid financial results are due which each state in that country now shows. Calling the growing trees in a forest, the forest capital, what was cut was only the interest in the yearly growth in wood, and with better management that capital has been increased from 26,040 feet. b.m. to 31,800 feet b.m. per acre. At the present time spruce pays at about 4 per cent. on the capital represented when grown pure under a rotation of ninety years. This is on medium mountain soil in the Bavarian Alps. Fifty years ago these forests were just being used to their fullest capacity. Before that they had scarcely been touched as being inaccessible. As is natural, the forests of Germany are situated chiefly in the mountains, where 70 to 80 per cent. of the land is under forest. Besides this, the largest areas are the sandy heaths in Hanover and East and West Prussia, so that really only about 10 per cent. of the forests are growing on good agricultural land. These for the most part are situated in river valleys, where the land is subject to floods. A gradual process is, however, taking place whereby the Prussian State, especially, is buying up poor, sandy land, which is going out of cultivation and planting it with pine. On the other hand, certain tracts of really good land have been sold and denuded of trees. During the last twenty years $500,000 has been spent annually for this purpose and enormous areas productively stocked with Scotch pine. Turning to the production of the tree which interests us most, white pine. This can be profitably grown or reproduced either by self-sown seeds or planting with three-year-old trees. In the former method the original crop is gradually removed leaving spaces sometimes as much as half an acre between the trees where the young trees come up in large quantities. When the area is seemingly well stocked more of the old trees are taken, still leaving a few so as to ensure all spaces being filled in. It has been found that from the first cutting of the old stand to the complete clearance of the same and restocking of the area by self-sown seed, it takes seven to ten years. This being done without any cost for seed or preparation of the soil. The old stand is of a dense nature and so the forest soil is covered with needles and twigs which rapidly decay when exposed to the atmospheric agencies. This leaves the soil in a receptive condition for the seed. Most of the branches and tops of trees cut down are either used as faggot wood or burnt. The spruce, the next most important tree to us, is largely re-

produced by planting, or about 80 per cent. of all areas. Only in the Bavarian Alps and a few other localities is it left to reseed itself. This is done by cutting the forest by strips up the mountain side, moving in opposite direction to the prevalent wind. When a strip is first cut it is three-quarters to a tree's length in width. This gradually widens as the first area becomes reseeded. Finally the first reseeded area has become old enough to cut again. A rotation of 85 to 90 years is adopted and yields timber of 16 to 18 inches square on medium soil. This size pays best as, if left to get larger, the increase in price does not more than pay for the interest on the money represented by the original trees. The author made interesting references to other trees and the method of dealing with them, and mentioned that a number of Canadian trees, such as the Douglas fir, had been introduced into Germany, and were growing profitably.

Another paper was by John Bertram on "Forest Management in Ontario." He highly praised the policy of this Government in creating forest reserves, the total area so set apart being 5,010,383 acres. There was still a large area of land north and west of the Temagami reserve, on both sides of the Height of Land, that was well adapted for coniferous woods, but not well suited for grain growing. This is owned by the province and only a small part is under license. The white and red pine are the most valuable on these lands, but there are spruce, hemlock and balsam, and he admitted that these, the less valuable woods, should be cut so as to allow the young pines to grow, which they will not do under the dense shadows of the low branching spruce, hemlock, etc. Under the present 15-year term of license, the pine will be cleared and the land grow up with the inferior woods. A change in the terms of license might lead to more care, as the old notion that pine would not succeed pine was now passing away. Land that was shown to be more fit for forests than for farming should be retained for the former purpose. In the country around Lake Nepigon and westward on the Height of Land, the prevailing timber was spruce. This region was frequently ravaged by fire and should be protected or it would become a veritable desert. It is supposed to contain a large quantity of merchantable pulpwood, and pending the question of making it a forest reserve it should be examined and brought under fire protection. The author suggested that in such districts as Muskoka, where lands suited for forestry and farming ran in uncertain patches, the settlers should be encouraged to become foresters as well as farmers, and this policy could be advanced by education in forestry. He gave an instance in Scotland, in 1902, when a man had 11 acres of 50-year-old spruce cut down for pulpwood and the returns in cash proved to be three times as much as if the land had been rented for agricultural purposes. Abandoned tracks of poor land should be taken in hand and reforested under municipal management.

In the discussion which followed, Mr. Bertram suggested to the Commissioner of Crown Lands of Ontario, who was present, that the Provincial Government might make an experiment in the operation of a small portable pulp mill designed to work up small patches of spruce, etc., into pulp. If this were found feasible, a large extent of woodlands could be made revenue producing. He also suggested experiments on the same plan with portable plants for making extract from tan bark. The Commissioner said he would consider the suggestions.

Principal Loudon read a paper on "Education in Forestry." Forestry education in the United States had made rapid progress, where a few years' preliminary campaign had resulted in the organization of several important Schools of Forestry, a lively interest among leading men of business and politicians (including President Roosevelt), the establishment of a Central Bureau of Forestry at Washington, of Departments of Forestry in several of the States, and

the widespread application of systematic forestry. It is, in short, regarded as a business proposition. Principal Loudon mentioned some of the misconceptions under which forestry suffered. He said that a fire ranger was no more a forester than a navvy was an engineer, that a forester's business is not to prevent the cutting down of trees, but to see them cut down to the best advantage, and that he is not a botanist let loose to air his fads at the expense of others. The Yale School of Forestry, the highest type of forest school on this side of the Atlantic, offered a course of two years' duration, with a thirty-six weeks' course each year. The first year's courses include a thorough training in the sciences fundamental for the profession, and preliminary training in forestry. The second year was devoted mainly to technical forestry. This included such subjects as silviculture, forest mensuration, forest management, forest technology, (including nature and uses of woods), lumbering, forest protection, and administration. An entire term of twelve weeks is devoted to practical forestry in the woods. The Toronto University course extends over three winter and two summer sessions. The standard for entrance is that of junior matriculation or of third-year standing in the O.A.C. The work of the first year is largely scientific, while the second and third years include further instruction in the sciences and in their application to forestry, together with a treatment of the various sub-divisions of forestry proper. The two summer sessions were devoted to practical work in the forest. There were many important interests to which the special knowledge of the forester would be of great profit. The administration of the Crown lands in Ontario had not been ideally perfect, lumbering had not been conducted with due regard to ultimate economy, and the farmer had not managed his woodlands to his own best advantage or that of the country as a whole. All these interests could be wonderfully helped by the trained forester. The province of Ontario had some 40,000,000 acres of lands suitable only for forest reserves, capable of giving an annual yield of 6,000,000,000 feet in perpetuity. The Government of Ontario should establish a Provincial School of Forestry, which would at the outset cost not more than a few thousand dollars annually.

On motion of John Bertram, the Ontario Government was asked to make a grant for the establishment and support of a Provincial School of Forestry.

A paper by Aubrey White gave a very full sketch of the history and present provisions of the Crown timber regulations of the various provinces. This was followed by a paper by W. C. J. Hall on the Laurentide National Park, of Quebec, a summary of which will appear in next issue.

Prof. Roth, of Michigan, gave an instructive address on what was being accomplished in the United States in forestry. He laid down the principle that if the individual was the only good farmer, the state was the only good forester, and this was being exemplified in the United States, where under the policy adopted in 1891 60,000,000 acres had already been set apart as forest reserves. The irrigator had learned this: "No tree, no water," and he was now a helper in the cause.

New York and Pennsylvania were now buying up the poor lands of the States and turning them into forests, and Michigan had decided on turning its woodlands into forest reserves. In consequence of reckless destruction of forests, one-sixth of the State was now "in soak" for taxes. The State was now going to set out from 50,000,000 to 100,000,000 trees, and is now teaching the school boys and college boys to take up the subject.

J. S. Dennis, Commissioner of Irrigation for the C.P.R., told what was being done in Southern Alberta to reclaim semi-arid lands, only about 15 per cent. of which could be irrigated, leaving the rest pastoral. The eastern slopes of the Rocky Mountains and the foothills form the watershed of the rivers and streams

and are the "catchment area" for the plains to the east, but the forests which cover these hills are rapidly disappearing from fires and reckless cutting, and if the process goes on, vast sums will have to be spent to restore the water supply which they afford. In W. Assiniboia., the Cypress Hills were the watershed for the drainage canals now being constructed, and timber is disappearing from those hills also. At present there are 163 irrigation ditches and canals in these two Territories with a total length of 475 miles and capable of irrigating 625,000 acres. With the completion of the C.P.R. scheme, these will be increased to 700 miles, irrigating 2,000,000 acres, the capital invested in the works being $7,000,000.

Prof. H. L. Hutt, of the Ontario Agricultural College, Guelph, in a paper on "Forestry Problems in Ontario," said the people had yet to learn about the management of forests. A larger staff of experienced foresters was needed, who would personally oversee the forests of the north. In the settled portions of Ontario the woodland in many counties was only 8 or 9 per cent., which was only about one-third what it should be to maintain the most favorable climatic conditions. The result was the snow, which should melt gradually and soak into the soil to support vegetation during the summer, went away rapidly, washing much of the fertility into the streams, which turned into serious floods. One of their first problems was to arouse an indifferent public to take immediate action to check any further removal of the forests. After noting the efforts made at the O.A.C. and the work of Mr. Southworth, Mr. Hutt quoted the resolution of the Ontario Experimental Union asking for the establishment of a school of forestry, for the collection of information and for the undertaking of reforestation demonstrations. On the whole, he was greatly encouraged with the results, and the work now being undertaken by the Government.

The election of officers resulted as follows: Patron, His Excellency, the Governor-General; hon. president, Wm. Little, Montreal; president, Aubrey White, Toronto; vice-president, E. G. Joly de Lotbiniere, Quebec; secretary, R. H. Campbell, Ottawa; treasurer, Norman M. Ross, Ottawa; directors, J. R. Booth, Ottawa; John Bertram, Toronto; Dr. Saunders, Ottawa; Prof. John Macoun, Ottawa; Thos. Southworth, Toronto; E. Stewart, Ottawa; H. M. Price, Quebec; Hiram Robinson, Ottawa.

At a subsequent meeting of the board the following vice-presidents for provinces were nominated: Rev. A. E. Burke, Alberton, P.E.I.; Hon. J. W. Longley, Halifax; Hon. J. B. Snowball, Chatham, N.B.; Hon. S. N. Parent, Quebec; Hon. E. J. Davis, Toronto; Sir Daniel McMillan, Winnipeg; Hon. L. J. Forget, Regina; Wm. Pearce, Calgary; F. D. Wilson, Fort Vermilion, Atha.; H. Bostock, Ducks, B.C.

On the invitation of Mr. Joly de Lotbiniere, it was decided to hold the next convention in Quebec City.

CROSSWISE FLOW ON THE FOURDRINIER.

A writer in the Wochenblatt fur Papier Fabrikation proposes to improve the felting operation of a Fourdrinier machine. It is a scientifically proved fact that the fibres of paper made on the Fourdrinier machine settles in the direction of the running wire. To this faultiness we attribute the difference in the strength existing between the cross and lengthwise direction of a sheet. In this respect paper may be compared with a web, provided either weft or warp have the stronger threads. The lengthwise settlement of the paper fibres prevails especially on the lower or wire side of the sheet. This is explained because the paper fibres float in the lengthwise direction of the stream, and as soon as they drop on the wire those in the lower part of the run are caused to settle, as they run, owing especially to the escape of the water through the wire.

These lower fibres in this manner con-

tinue to retain their parallel position while the upper fibres, still moving on, are being influenced by the shaking motion of the wire, and may settle in various directions. Examinations made by different persons have shown that this difference in the strength in the lengthwise tearing exists in most cases in the sheet when it leaves the wire. As shown by valuable tests made by Joy, this unfavorable condition is still increased by the roller process in the couch press, and by the action of the drying cylinders and by tension generally. The writer makes the following suggestion: In order to provide for a possible equalization of the conditions of strength in both directions, although the disturbing influences, caused by the process of pressing and that of drying may be found partly unavoidable—we must strive to change conditions hitherto existing on the wire. Therefore the paper should become strongest on the wire, in a direction crosswise to the run of the machine wire, and this is made possible only by a crosswise settling down of the fibres.

In order to reach this crosswise formation many ways have been tried in many different directions. A stream of air through the sluices has been applied, in order to whirl up the fibres. Another plan is to fix the flow box stationary, excluding it from the wire shaking process. In the latter way the stuff is caused to change suddenly from a state of rest into one of motion, thereby influencing the fibres into a crosswise or oblique position.

Let us consider more closely this motion, affecting the formation of paper on the wire. In the usual arrangement of the flow box the outgoing paper stuff is affected by the shaking motion of the wire. Suppose the stuff to show a shaking velocity of V_2 and of V_1 in the running velocity, in which case a fibre sliding over the breastboard would have the resultant velocity of V_3, in a diagonal direction. Owing to the running of the wire C_1 and the shaking C_2 the wire assumes the resulting motion C_3, also diagonal. Now the fibre reaching the wire will immediately follow the motion described as C_3. However, the fibre is already moving in that same direction, because V_3 and C_3 differ but slightly in their directions. Consequently the position previously held by the fibre will not change on the wire. The forepart of the fibre reaching the wire will at once adopt the direction described as C_3, while the rear part of the fibre moves forward in the direction of the running of the wire. These motions will produce a small deviation of the fibre from its lengthwise position into a more radically diagonal one. This diagonal settling of the fibre appears more evidently if we go a step further by imparting a special shaking motion to the fibre before it reaches the wire.

It is readily observable that the result is a strong influence in the direction of the fibre from a lengthwise into a diagonal position as it passes from the float-box to the wire. What prevents us now from furthering the contrast in the motions of stuff or wire? Why not direct the stuff to the wire in the direction opposite to that of the wire? Such an arrangement augurs the greatest advantage to the benefit of fibre felting. In case the paper stuff runs on to the wire then there will hardly be any question concerning a possible carrying along of the fibre in a lengthwise direction—on the contrary, the fibres will be pushed against the wire meshes—they will tumble over each other, bend and mix pell mell, in short, they will felt in a desirable manner. We may also allow this inverted run of stuff to take part in the wire shaking, or we may make the arrangement stationary, or we may shake it in a direction opposite to the wire shake. An ideal condition is certainly reached because the stuff run receives a separate shake opposite to that of the wire.

It need hardly be said that naturally not all the fibres having presented themselves in a lengthwise direction, will undergo a change of that direction upon entering the wire. The lower part of paper-forming fibres will be influenced

mostly, and just for that part the crosswise settlement is the most desirable. In general, I believe, that owing to these arrangements of the stuff run, compared with former methods, an increased crosswise settlement will be obtainable and consequently a more advantageous felting of the fibre, whereby the unpleasant difference between the values of firmness in the length and crossways of paper will be finally reduced or entirely abolished.

Mill Matters

The Brompton Pulp and Paper Co., Quebec, has now 14,000,000 feet of wood ready for this spring's drive.

It is understood to be J. R. Booth's intention to add a paper mill to his new pulp mill at Ottawa, Ont., and so manufacture the product of the latter, instead of selling the raw material.

A fire causing $300 to $400 damage occurred at the Riordon Paper Mills on February 28th. It originated from a machine on which two men were working at the time. The cause is unknown.

An American company have recently purchased some property near Louisburg, N.S., and propose to establish a talc or soapstone industry. The land is said to contain valuable deposits of this material.

A sad accident occurred at the Toronto Paper Company's mill, Cornwall, Ont., on March 5th, when the daughter of J. Hanton, Holyoke, Mass., recently of Cornwall, fell into a steam exhaust drain and was fatally scalded. The child, who was only seven years old, went into the mill to call her brother-in-law to supper.

The chemical pulp mill of the Canada Paper Co., at Windsor Mills, Ont., is rapidly approaching completion. The boiler house is ready for roofing, and one of the four 250-h.p. boilers is on the ground. The Spring Vale paper mill of this company has been closed down for a week or so owing to a shortage of water.

The water-power on the St. Francis river, at Trenholmeville, about six miles from Richmond, Que., has been purchased by E. W. Tobin, M.P., and F. N. McRae, of Sherbrooke. They propose to erect a dam and pulp mill during the summer.

The Ontario Department of Crown Lands has received an application for a lease of a valuable water-power at Canal Rapids on the Magnetawan river, near Georgian Bay. The proposal is to build a large pulp mill and other industries. Mayor Johnston and Barrister Haight, of Parry Sound, are among the applicants.

A number of Belgian capitalists, who have invested in the pulp and paper industries comprising Colonel Thys, Max Devolder, president of the Société Generale,, and Mr. Cito, of Brussels, accompanied by General C. A. Whittier, of New York, have been visiting the Shawinigan Falls, Que., with a view to satisfying themselves and also to report to other capitalists in Belgium upon the resources and possibilities of the Dominion from the point of view of speedy development.

Improvements have recently been made in James Davy's pulp mill, Thorold, Ont. Two grinders have been replaced by a heavier one of the same type, which is coupled direct to the power shaft, instead of being driven by belts. The output has been increased from five to eight tons per day, one ton of pulp being produced for each 50-h.p. Edward O. Babcock, of Niagara Falls, has lately been appointed manager.

The Clergue industries at the Sault, including the Sault Ste. Marie Pulp and Paper Co., have been reorganized under the name of the Lake Superior Co., with C. D. Warren, of the Metropolitan Street Railway, Toronto, as president. Thomas J. Drummond, of Montreal, vice-president, and Cornelius Shields, general manager. Among the directors are E. J. Berwine, J. T. Terry and J. M. Hoig, of New York and Philadelphia. The

head office will now be in Toronto. The Ontario Government proposes to guarantee the bonds of the new company to the extent of $2,000,000.

The Maritime Sulphite Fibre Company's extensive properties in Chatham were sold by auction on February 25th to the Bank of Montreal for $120,000. There were three bids—$100,000, $110,000, and $120,000. The bank holds bonds amounting to $450,000, in addition to prior mortgages and liens in its favor for $50,000. The referee in equity accepted the bank's bid, thereby confirming its title to all the property, including the lumber rights in 262 square miles of timber limits. Experts, who have recently examined the mill, report the machinery in excellent condition and the timber limits ample to supply the output of the mill. Negotiations for the sale of the property to American capitalists are in progress. It is expected that now that the bank has a complete title an actual sale will be made and the mill resume operations at an early date.

An agreement, subject to ratification by the Legislature, has been entered into between the Commissioner of Crown Lands for the Ontario Government, and the Dryden Board Mills, Limited, of which T. A. G. Gordon is president, and C. B. Gordon, secretary. The company agrees to erect and operate pulp and paper mills on the Wabigoon river, at Dryden, Ont., and to spend thereon at least $200,000. Construction is to be commenced by July 1st, 1904, and the work completed within two years. The daily output of the mills must be not less than 30 tons, and an average of seventy-five hands must be continuously employed. The company have deposited $5,000 as an evidence of good faith, to be returned when $30,000 has been expended on the plant. The Government grants the right for 21 years to cut spruce, poplar and banksian pine on all unoccupied Crown lands, bounded by lines drawn from Wainwright township to Raleigh Station, and Stormy and Peak lakes; the company to pay 40 cents a cord for spruce and 10 cents for poplar or pine. All timber privileges are subject to the following clause embodied in the agreement: "It is understood and agreed that the pulpwood cut for or by the said company upon the territory before referred to shall be manufactured into board or such other class of manufactured paper goods as the company may produce at their mill and that the said mill be located at the village of Dryden, on the Wabigoon river, and shall not be sold in the wood or unmanufactured condition to any other person or persons." The company will have the exclusive use of the Wabigoon Falls for power, which is estimated at 2,000-h.p.

Since signing the agreement with the Ontario Government, the syndicate headed by E. W. Backus, of Minneapolis, has started carrying out its plans for developing the water-power of Fort Frances. Flour mills, sawmills, stave and barrel factories and furniture factories are included with the pulp mills referred to in a previous issue. Operations on the pulp mill will be commenced before the year is ended. This is the mill of which W. A. Preston is the manager, and which has a concession of 300 square miles from the Ontario Government. Mr. Preston also informs the Winnipeg Free Press that in addition to the mechanical pulp mill, chemical pulp mills will be established, similar to those at the Soo. The intention of the pulp company was to have erected their mill on their location at Sand River Falls, near Mine Centre; but on account of the development of the water-power at Fort Frances, and the low cost at which power can be produced, they have deemed it advisable to arrange with an American company for power at Fort Frances, thus doing away with the necessity of putting in their own dam and installing their own electric machinery, and besides giving them the additional advantage of the markets of the United States. Being close to the lines of railways entering Fort Frances from the south, a saving of freight will be effected which in the pulp business is an important factor.

The Petewawa Pulp Co. has sold its water power to the Petewawa Power Co., who will transmit electric current to Pembroke.

The new mill of the Cornwall Paper Mfg. Co. is now under construction, and the company looks forward to being able to commence running about September next.

Owing to the snow blockade, which prevented them from getting in material, W. J. Finlay & Co., of Strathcona, have been delayed in equipping their new mill, but they expect to commence operations early in April.

The water will be let out of the Cornwall Canal for a few days for the annual overhauling of the locks, and this will cause the usual shut down of the Toronto Paper Mfg. Co.'s mill for about three weeks during which necessary repairs will be made to the mill.

Capt. Marsh and Manager W. Duperow, of the Huntsville and Lake of Bays Navigation Company, are seeking aid from the Ontario Government for a line of tramway, a mile in length, between two of the lakes navigated by the company. The tramway will be used for passengers and also for carrying bark and pulpwood, which are being shipped out in large quantities.

The Brockville Times makes the following comment on the protection of the Canadian paper and pulp industries: "The Newspaper Publishers' Association of the United States want Congress to give them free paper and pulp, claiming that 50 per cent. of their pulpwood is drawn from Canada. If the Canadian Government is alive to Canadian interests and will stop catering to Washington, it will keep the Canadian pulp and paper business for Canada. If the United States wants Canadian paper and pulp, let their paper makers come over into Canada and make it here. Canada has the material, and holds the whip hand. Will the Laurier Government protect Canadian interests or will it continue to shilly-shally with free trade, reciprocity, etc., to the detriment of this country."

NEW COMPANIES.

The Clark Lithograph, Limited, Toronto. Capital, $150,000. To acquire the business of the Clark Lithographic Company, Limited; and to carry on business as printers, publishers, lithographers, Fanny L. Clark, T. J. Clark, H. E. Miller, F. W. Grew, and T. A. Rowan, of Toronto.

Southam, Limited, Hamilton, Ont. Capital $1,000,000. To establish, print and publish newspapers in the cities of Hamilton, Ottawa, and other places in Canada. Also to acquire the following firms and companies: Southam & Carey, Montreal; the Ottawa Citizen Co., Limited, Ottawa; the Mail Job Printing Co., Toronto, and "The Spectator," Hamilton, Ont. W. Southam, W. J. Southam, of Hamilton, Ont.; F. N. Southam, of Montreal; W. M. Southam, H. S. Southam, Ottawa, Ont.; R. Southam, of Toronto.

The New Brunswick Publishing Co., Limited, St. John, N.B. Capital, $95,000. To print and publish a newspaper or newspapers in St. John or elsewhere in New Brunswick. To operate a plant or plants for the generation of electric lighting and power necessary for their business, with power to dispose of any surplus electric power and lighting so manufactured, etc. T. McAvity, H. A. McKeown, C. J. Milligan, E. Lantalum, W. G. Scovil, and D. J. Purdy, of St. John; C. S. Hickman, Dorchester; K. Shives, Campbellton; Hon. C. W. Robinson, C. A. Murray, A. E. Peters, and J. T. Ryan, of Moncton; A. Hilyard, Dalhousie; J. B. McManus, Memramcook; M. F. Keith, Harcourt; E. A. Smith, Shediac; H. Copp, Sackville; Hon. A. R. McClelan, Riverside; and Hon. A. S. White, Sussex; all in New Brunswick.

The Times Printing and Publishing Co., Limited, Victoria, B.C. Capital, $100,000. To acquire the business of the Victoria Times Printing and Publishing Company, Limited, and to carry on the business of printers, publishers, etc.

WAX PAPER.

Paraffine, or wax paper, is finished by steeping weak sized thin papers in hot liquid solutions of paraffine ceresine, Japan wax, or beeswax. The liquid sizing is imparted to the paper by a roller, and the excess is removed by a doctor. The heating of the paraffine, or wax, is best done by steam in a jacket kettle, connected with a valve and tested to a pressure of four atmospheres, the highest pressure producing the highest temperature to be applied to the liquid. By raising the temperature to a high degree the solution readily impregnates the paper, thereby causing a saving of material.

When steam heat is not available, gas may be used by arranging a row of burners, and in this case a single-bottomed kettle is sufficient. The space under the trough should be closed by a wire netting, as wax and paraffine boiling at a high temperature develop combustible gases. A piece of machine wire will answer for this protection to prevent the ignition of the gases by the burners. A thermometer reaching 200 degrees C. should be connected with the trough, and attention paid to keep the liquid at a uniform temperature. Otherwise a correct calculation of the cost cannot be obtained.

The proper temperature for the various quality of the materials differs materially according to their respective melting point. It should be at least 10 degrees above the melting point of the sizing, although it should not reach the boiling point of the stuff. The following shows the melting point and applicable temperature of various sizes:

	Melting Point. Deg. C.	Apl. Temper. Deg. C.
Beeswax	63-64	70
Japan wax	42-43	55-60
Chinese wax	82-85	100
Ceresine	60-65	80
Paraffine	42-55	55-70

The dissolving of these materials with benzine or other solvents is not advisable partly owing to the danger of fire and partly because imperfect evaporation will leave a scent on the sheet. Commercial liquid paraffine is not suitable as it will not dry hard enough.

The front doctor roll of the coating machine may be made of a tube, such as a polished gas pipe of 30 millimeters, outside diameter, connected by pipes with the steam heating appliances. The distance of the scraping device from the coating roller should be about 15 centimeters and in case the transparency of the paper should not prove sufficient, this distance should be increased. This, however, will cause the use of more size. Roller and trough may be of iron. After passing the doctor the paper is carried a certain distance for the purpose of cooling over several rollers and reeled. Drying is not required, as the cooling hardens the coating. It would be objectionable to apply drying heat. The paper will feel the harder the higher the temperature.

The selection of the coating material should follow this principle; for papers used for wrapping articles of food, such materials should be selected that are either scentless, or have a pleasant odor, as, for example, beeswax. Paraffine, purified with sulphuric acid and bone carbon, is perfectly odorless. Ceresine is frequently made to take on the scent of beeswax by various essences. Japan wax always has a weak tallowish smell. China wax has a singularly mild aroma.

For wrapping articles of food, tea, coffee, etc., paraffine of a high melting point is preferable. For fruits, beeswax, owing to its aroma, is frequently demanded. Japan and china wax are principally used for wrapping hygroscopic chemicals, various chemical preparations, and photo paper. Beeswax is the most expensive. Japan and China wax cost about one-third as much as beeswax. Paraffine and ceresine are the cheapest, according to quality. Beeswax is frequently found adulterated with ceresine which may be detected by the saponifying test, as ceresine will not saponify. For making wax paper the

raw material should be medium-sized—not too hard, nor too weak, and calendered paper is preferable, as unfinished stock consumes more of the preparation.

Wilhelm Frensel, of Dresden, has recently perfected a machine for coating paper with paraffine, wax, etc., on both sides. The upper part is arranged for heating with either steam, gas, or petroleum, and a rack gear and crank serve to lower or raise the tank. The latter is lowered before starting the machine and may be filled with from 8 to 10 kilograms of paraffine, to be melted to the consistency of water. The following qualities are used according to object and price of paper:

When the melting of the wax is perfect, the tank is to be raised and the paper is made to pass under rollers through the solution. After leaving the paraffine bath, it is scraped of the surplus paraffine by three thin sheet doctor blades. During warm summer days the wax paper is cooled by means of an air blast attached to the machine. Silk paper of 15 to 18 grams per square metre soaks in this process from 6 to 8 grams paraffine to the square metre.

It is desired by every wax paper maker that the paper shall soak as little paraffine as possible, and yet present a fine, uniform appearance; that it shall resist humidity and not have a too greasy feel. To attain that object Mr. Frensel has made a machine for coating on one side only. A doctor scrapes the wax after the coating roller has applied it, and a paper is produced that requires less of the coating composition than the double coated paper; yet some qualites of paper are so absorbent that one coated side absorbs the same quantity as paper when coated on both sides.—Papier Zeitung.

ELECTROLYTIC BLEACHING.

Since the process of bleaching paper stock materials is not only costly, but troublesome, and, unless carefully conducted, liable to cause deterioration of the stuff, any method which is simpler, cleaner, and more direct, should receive the careful consideration of manufacturers. The use of hypochlorite solutions prepared by electrolysis answers these requirements, with an additional advantage that there is less risk of damage to the stock by reason of residual chemicals than in the case of bleach solutions prepared in the usual manner. Up to the present time, however, the cost of producing such solutions has prevented their competing favorably against the use of bleaching powder in the paper mills.

The construction of plants for preparing hypochlorite solutions by electrolysis has occupied the attention of many investigators, and numerous processes have been patented. Among the earliest workers in this field may be mentioned Charles Watt, of paper mill fame, who in 1851 took out a patent for decomposing chlorides of sodium and potassium, and of metals of alkaline earths in hypochlorite, by electricity. Following Watt, came many other inventors; but it was not until 1886, when Hermite brought forward his process, that the subject can have been said to have got beyond the experimental stage. Hermite's method consists in the electrolysis of a solution of magnesium chloride and, latterly, of common salt with a small proportion of magnesium chloride added. The electrolytic solution is used at a strength of about 3.0 grammes chlorine per litre, and is run into the potcher during the bleacihng operation in a continuous stream. The excess is drum washed, and returned to the electrolyser, and brought up to strength, the process being a continuous one. This system was adopted extensively in France, but did not obtain a footing either in this country or the States.

Since Hermite's time, much progress has been made in this direction, and numerous patents have been taken out having a more or less industrial value. Among others who have secured such patents may be mentioned Greenwood, Andreoli, Le Suer, Holland, Richardson,

Castner-Kellner, Bird-Hargreaves, Rhodin, and, more recently, "Haas & Oettel." Of these, the Bird-Hargreaves process is being worked with success by the Electrolytic Alkali Company, at Middlewich, and the Castner-Kellner by the United Alkali Company, while the Rhodin plant has had varying success in the States, being used by the American Alkali Company.

The Haas & Oettel apparatus has been adopted by many Continental firms. An English patent was taken out in May, 1900, and a small plant has been installed at the new Technical School, Manchester; and, no doubt, results obtained from its workings will be awaited with interest by our manufacturers. The invention consists of a wooden box containing the electrolyser which is subdivided by carbon electrodes into numerous cells having no communication with each other, but having external openings at the bottom and sides communicating with the brine in the tank. The brine liquor (solution of common salt), is run into the box until it is nearly full, and then the electric current is passed through, causing the liquor to effervesce in a lively manner due to the evolution of hydrogen, which raises the liquor in the cells, and it flows through the top outlet, while a corresponding amount of liquor flows in at the bottom inlet, thus producing a constant, steady circulation, continuing as long as the current is passing. By this ingenious arrangement, the use of a pump for circulating is dispensed with.

The action takes place as follows: The salt solution decomposes into its constituents—sodium and chlorine. The sodium cannot exist in the aqueous solution, and at the moment of its liberation is converted into caustic soda. The chlorine, being liberated at the other electrode, immediately forms sodium hypochlorite, which is, of course, the bleaching agent. The hydrogen bubbles, which are made use of for circulating, are formed by the electrolysis of the water. The current is passed through the brine until a solution of sufficient strength of available chlorine is obtained, and the liquor then run off.

To bleach linen, cotton, etc., a solution containing from 2 to 5 grammes of active chlorine per litre is sufficient; but to bleach cellulose, where a large amount of water has to be dealt with, practice has shown that stronger solutions are necessary, from 4 degrees Tw. to 6 degrees Tw. being generally used (11.41 to 17.36 grammes available chlorine per litre.) It is claimed that electrolytic solutions have the advantage of a greater efficiency over ordinary bleach solutions in the ratio 5 : 3 :: 1.66 : 1. But this effect was only obtained in Cross & Bevan's experiment with the Hermite solution when the liquor was in continuous circulation between the potcher and electrolyser. Cross and Bevan admit that if this method is not followed, it involves a certain sacrifice of bleaching efficiency, which Clayton Beadle has shown to be equal to a loss of from 30 to 40 per cent. in the case of linen and cotton stuffs, so that little advantage is obtained by reason of increased efficiency of bleach solution.—Paper Maker.

In consequence of the increased cost of white paper and other materials, and the advance in wages, the proprietors of the four daily newspapers of Vancouver have given notice that the price of their papers will be advanced on or before August 1st.

The paper bag section of the Canadian Paper Manufacturers' Association met at Ottawa last month. It was found that there was a shortage in all lines of wrapping paper, as well as news print. An advance of 10 per cent. at the mills has been made on wrappings, but no change will be made in paper bags, the stocks of which are fairly good in makers' hands. The severe weather and the increase of the fuel bill, owing to the low water, has made such an advance among the things expected.

PAPER STOCK MARKET.

Montreal, 18th March.

With the starting up of some of the paper mills shut down for want of water-power—and increased activity in others—from the better flow of water in the rivers, there comes an improved demand in all lines of paper stock. Even in bagging, hitherto unsaleable, there has been some slight movement, and sales are reported at $10 to $11. Blues and thirds are scarce, and we increase our quotations. For lack of domestic supply some import orders are being placed. Satinets are also moving freely, and at better prices. Waste paper is the only line that appears to be more in supply than demand. The better grades of book paper stock are selling readily to United States mills. There is no manilla rope in this market.

New cotton cuttings of all kinds are in active demand.

Domestic white rags	$2.00 to	$2.10	per 100
Mixed bagging	55 to	65	"
Blues and thirds	1.25 to	1.30	"
Dark cottons	75 to	90	"
Roofing paper stock..	50 to	55	"
Waste papers	35 to	45	"
Hard white shavings.	2.00 to	2.10	"
Soft white shavings...	1.00 to	2.10	"
Book stock	75 to	90	"
Manilla rope	1.90 to	2.10	"
Sisal and jute string	75 to	1.00	"
Flax tow	1.10 to	1.25	"

THE MARKETS.

With the soft spells of the present month, the water has risen sufficiently in some of the rivers of Ontario and Quebec to enable mills to resume work. The railways after a very trying time are now moving freight, but the accumulation of cars at sidings and in yards cannot be cleared away in a day, and it will be some time before traffic will be fully restored. In pulp alone it is estimated that from 200 to 300 carloads are stalled at stations throughout Ontario and western Quebec. As the pulp mills get to work, prices for mechanical pulp will drop to something near their former level. Sulphite pulp, which is now selling to Canadian mills at $1.95 to $2.10 per cwt., will probably fall to $1.85 to $1.90, when production is fully resumed.

In the United States market as high as $20 is reported to have been paid for

(Continued on page 20.)

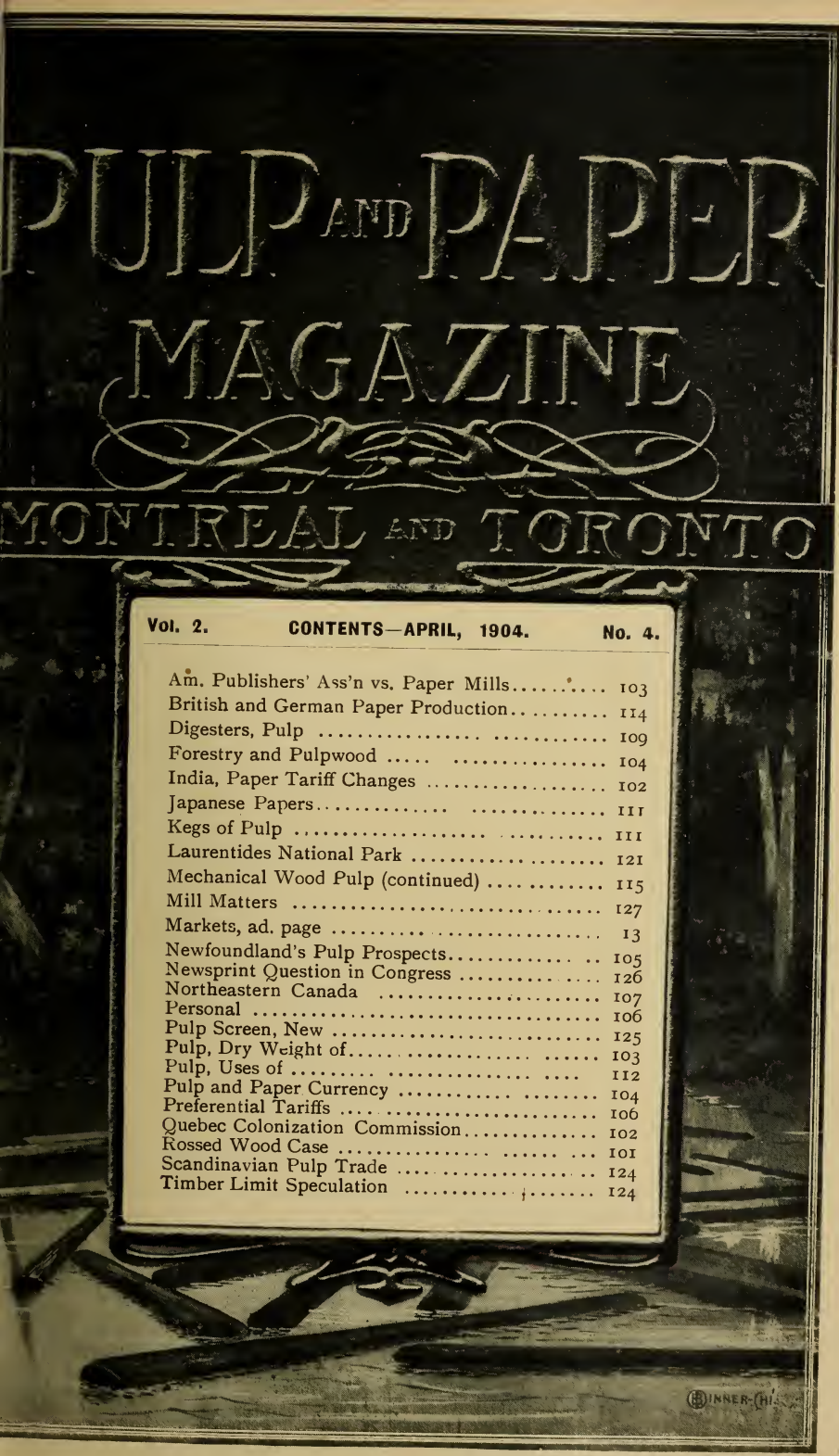
ground wood in the eastern market since the beginning of March, and the supply of all grades of chemical fibre is unusually low, but such conditions must by this time be at an end, as there is plenty of water in most of the rivers of the Eastern States.

BRITISH MARKETS.

Prices in London and Manchester are firm for chemical pulp. Prices quoted are: Bleached sulphite, £11 10s. to £12; unbleached, first quality, £8 10s. to £8 15s.; second, £7 15s. to £8. Soda fibre, first quality, £7 10s.; second, £7.

Scandinavian makers are firm in their demands for mechanical pulp, and prices are advancing. Prices are quoted at £2 to £2 2s. 6d. for wet pulp for spot delivery, and £2 5s. for forward delivery. Mechanical, dry, £4 5s. to £4 10s.

In the British chemical trade, reports the World's Paper Trade Review of 4th March, the tone is somewhat dull, with a moderate demand for export. Ammonia alkali, 58 per cent., stands at from £4 10s. to £5 per ton on rails at works; caustic soda, 76 to 77 per cent., £10 10s. to £10 15s.; bleaching powder, £4 5s. to £4 10s.; and soda crystals, £3 2s. 6d. Recovered sulphur is scarce at about £5 10s. per ton. Sulphate of alumina and blanc fixie unchanged. In foreign chemicals the demand is steady without any alterations in quotations.



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PULP AND PAPER MAGAZINE OF CANADA

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Pulp and Paper Magazine

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BIGGAR-SAMUEL, LIMITED,
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—The Ontario Government has proposed, and apparently will carry through at this session, a bill to guarantee $2,000,000 of the bonds of the Lake Superior Co., the new owners of the Sault Ste. Marie Pulp and Paper Mills. The people have always had a good deal of sympathy with the misfortunes of the shareholders and promoters of the Soo industries, but why the public credit should be pledged to rehabilitate the company any more than if the firm of John Smith & Co., of Podunk, fell into undeserved bankruptcy is more than most people can see. The act is a violation of sound principle, and can no more be justified than the payment out of public funds of the princely salaries of Soo officials during the period of panic after the failure.

—Since last issue, another decision of interest to pulpwood dealers and timber limit owners in Canada has been handed down by the Board of General Appraisers of the United States. This relates to "rossed" or peeled pulp logs which have for some time past been classified as "blocks or sticks of wood, rough hewn," and so made dutiable at 20 per cent. when entering the United States from Canada. The assessment of duty was the legitimate carrying out of the policy of protecting every line of manufacturing that can possibly be carried on in the country; but the effect was to raise the cost of pulp and paper to United States mills. This in turn helped to raise the cost of paper to the publishers of the big dailies, and to publishers in general, and led to the outcry which culminated in the attempt, reported elsewhere, to get the duty taken off pulp and paper altogether. The interests affected have been ever since besieging the Government at Washington, which, while it has choked off the commission of enquiry has yielded to the paper manufacturers by a change of policy on the importation of rossed wood. This wood, by the last decision of the board of appraisers, will now be admitted from

Canada free of duty as paper stock. By a curious misconception of Canadian opinion, many United States politicians and journals make a merit of their necessities, and represent this decision as a concession to Canada. They have somehow imbibed the notion that this country's hopes of happiness depend on getting its pulpwood into the United States. Such a notion may perhaps be justified by the pulpwood policy of the Quebec Provincial Government, but if a plebiscite of the Canadian people could be taken, we venture to say that, so far from desiring to rid ourselves of our surplus pulp timber, 19 out of 20 would vote for a heavy export duty on such timber.

As India affords a large and increasing market for pulp and paper, Canadian manufacturers should note that important tariff changes have taken place there affecting paper, pulp and printing materials. The following have been placed on the free list: Pulp of wood, straw, rags, paper, and other materials. Printing presses, type, ink, brass rules, composing sticks, chases, imposing tables, and lithographic stones, printed books, maps, charts, and music. An ad valorem duty of 5 per cent. is levied on the following goods: Paper, pasteboard, mill board, and cardboard of all kinds, including ruled or printed forms and account and manuscript books, labels, advertising circulars, sheet or card almanacs and calendars, Christmas, Easter, and other cards, waste paper and old newspapers for packing, articles made of paper and papier-maché, stationery, excluding paper toys, including toy books, and requisites for all games.

—Alex. Maclean, who is going to Japan in May, as Canadian trade commissioner, is making a round among Canadian manufacturers before leaving. He has secured from Mr. Nosse, Consul for Japan, at Montreal, a list of articles for which there is a market in Japan, among which are paper and pulp. As is well known, the Japs use a great deal of paper, of a peculiar texture, for the manufacture of which a certain quantity of pulp is required. They also consume news and other papers, which are imported. The demand for these is rapidly growing, and there is no reason why Canada should not enjoy a portion of the trade. When Mr. Maclean reaches Japan, he has promised to let the manufacturers know, through the Pulp and Paper Magazine, particulars as to the classes of paper in demand and other conditions affecting the trade. His address will be at Yokohama.

—The first volume of the Quebec Colonization Commission's report has been presented to the Legislature. The commission is emphatic in its opinion that the trouble in the timber limits comes from the speculator, and that there is no general conflict between the bona fide settler and the limit holder, so far as colonization goes. Speculation in wood lots has gone to such a length as to endanger the stability of the pulp and paper industries, and the blame is placed on the Government land agents. The extent of the fraudulent transfer of rights has got to be a scandal, and the commission recommends the automatic cancellation of rights where the conditions of settlement have not actually been fulfilled. It recommends also that fire rangers be paid by the timber license

holders, but that the work of the rangers be controlled by the Government; and that water powers be sold with the limits by public auction to maintain a proper wood supply for the pulp and paper mills. But perhaps the most important recommendation from a manufacturer's point is that a bounty be paid on all exports of paper made from wood cut in the province. Considering that the finances of the province are in chronically bad shape, and that deficits are of yearly occurrence, it would not be easy to justify the taking of money from one class of the community to give it to another. The present pulpwood policy of the Quebec Government takes about $30,000 annually out of the pockets of the pulp men, for the sale of $15,000 derived in revenues from Crown pulp lands, in pursuance of a policy which, if continued, will strip the province of its greatest natural asset, and leave its best agricultural areas a barren waste, through the destruction of the forests. The only thing the Quebec Government can do is the thing it is not likely to do. For a pulp and paper policy that will be effective, we must look to the Dominion, and not the Provincial Governments.

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The complaint of the American Publishers' Association, regarding the increased price of news print, caused by combinations, is one that can with equal force be urged against the trusts that control other trades; and the remedy, which the association wants Congress to apply, strikes at the base of all protective tariffs. The publishers should not claim for their own trade what they are not willing to concede to other trades and industries. If free paper is good for them, free iron is good for the engineering trades, free wool for the textile trades and so through the whole scale. The paper manufacturers reply to the association by showing that the publishers sell their papers at less than cost and desire to force the paper mills to do the same in order to help them out. It is recalled that in the early days of the "penny newspaper," a four-page paper with condensed news was the rule,, but it is impossible to get back the cost of a paper containing 12 to 16 and even 24 pages at a cent each. It has always seemed to us a useless waste of paper and ink to plaster half an issue over with vulgar headings, that do not add one atom of value to the news. Canadian papers are beginning to sin against themselves in the same way. A return to the modest headings that prevail in British dailies would save American newspapers an aggregate loss of hundreds of thousands in a year in money, and save an equally important loss in the respect of discriminating readers. There is more than one moral to be drawn from the relations of the publishers and paper makers. If the United States had the courage to throw off all import duties and raise the revenues it needs by direct taxation, it would become the greatest manufacturing and commercial power of the world. Then each industrial tub would stand on its own bottom, and yet the effect upon Canadian trade would also be good. Millions of United States money would then be invested in Canadian pulp and paper mills, and yet the publishers and general public of the United States would be the gainers by getting cheaper pulp and paper, the American mills more than gaining in foreign markets what they might lose by having to share some of their home trade with Canadian mills.

Forestry and Pulpwood

About 20,000 cords of poplar have been cut within 100 miles of Ottawa, east and west along the Canada Atlantic, all of which has been secured for United States mills.

In the Quebec Legislature, petitions have been presented from the Gres Falls Company, St. Maurice Lumber Company, the Belgo-Canadian, the Burgess Sulphite Fibre, and other companies and individuals interested in the floating and driving of timber on the St. Maurice and its tributaries for incorporation as the St. Maurice Driving and Lumber Company in order to enable them to take joint and united action, as heretofore, for the floating and driving of their lumber.

Price Bros. & Company will have an output of from 12,000 to 15,000 cords of spruce from their mill at St. Marguerite river, Que. At Pentecost, the company, of which B. L. Taylor, of New York, is the head, is developing a large plant, the output of which will be 10,000 cords, to be increased next season. It is the intention of this company to install twenty barkers. The St. Lawrence Terminal Company will make rossed wood at Cedar Hall, and also at Ste. Anne Des Monts, the latter of which properties was recently acquired. The Battle Island Company will turn out 30,000 cords of rossed pulpwood, to go to Oswego by water. Most of these shipments, aggregating 60,000 cords, will be made in vessels of the Great Lakes and St. Lawrence Transportation Company.

In a recent address before the National Science Association of Toronto University, Thos. Southworth, Director of Forestry for Ontario, sketched the development of the timber industry in Ontario from 1827, when the Crown revenue from timber dues was only $267, down to the present, when the annual revenue was over one million dollars. There were in the province, he said, some forty million acres of timber lands that were not suited for agricultural purposes, and which would probably be preserved by the Crown in perpetuity, the timber thereon ready to be cut being sold annually by auction. It was estimated that the yearly yield would total some six billion feet, and if only half the amount realized per acre in Germany accrued to the Crown, the annual revenue of the province would be $30,000,000. He expected to see the day when Ontario's revenue from her Crown forests will realize this amount.

As mentioned last month, a motion was introduced in the New Brunswick House by J. K. Fleming, member for Carlton, with the object of legislating to prohibit the export of logs to the State of Maine. The purpose was to protect home mills, but it was found on investigation that a nearly equal number of logs from Maine were floated down the St. John to be cut in New Brunswick mills, so the House reported against the proposed measure.

The annual general meeting of the Province of Quebec Pulpwood Association was held at Sherbrooke, on the 12th inst, when the following directors were elected: H. M. Price (president) Quebec; E. W. Tobin, M.P., Brompton Falls, Q.; F. N. McCrea, Sherbrooke; O. C. Morissette, Lake Megantic; G. H. St. Pierre, M.P.P., Coaticook; O. Brouillard, Carmel, Q.; G. C. Poulin, St. Johns, Q.; G. T. Smith, Montreal; B. C. Howard, Sherbrooke; G. P. Nadeau, Stanfold; John Campoux, D'Israeli, Q. The annual dinner will be held in Sherbrooke on the 31st May.

Pulp & Paper Currency

J. S. Larke, the Canadian Government agent in Australia, gives a hint to pulp manufacturers. In one of his last reports he says: "In the cities what is known in the trade as French tile is used for roofing. I have had an enquiry whether a tile is not or could not be made of paper pulp that would take the place of the French tile. It may be that if

consideration is given to it, such a tile could be produced by a process akin to that used in making indurated fibreware. The objection to the French tile is its weight, its tendency to absorb moisture, thus increasing its original weight and creating a growth of vegetation that speedily discolors it. A fibre tile would be much lighter, be moisture-proof, preserve its color better, be less liable to break than either slate or tile, suffer less from expansion and contractions through variations in temperature, and be free from the rattle in a storm, characteristic of metal. Could a fibre tile be produced at a moderate cost, there would be a large demand for it in Australia."

From a paragraph in another part of this issue, it appears that the paper production of Great Britain is only vaguely known to experts. This seems to be because of the peculiar notions that prevail among the British manufacturers generally that their shops and output should be kept a profound secret. The very contrary idea prevails in Canada and the United States, and we do not know of a mill in this country where visitors are not welcome at proper hours or where general statistics of the output cannot be obtained. This subject came up at the recent annual meeting of the Paper Makers' Association of Great Britain, and Lewis Evans, a prominent member, said it was a reproach that statistics of paper production were not available. Mr. Evans gauged the sentiments of his fellow members, when he made the conservative suggestion of employing a chartered accountant to whom the returns from mills would be confided, and who —shades of the congregation of Egyptian guilds!—would be strictly bound to secrecy. This proposition was referred to a committee to report upon.

NEWFOUNDLAND'S PULP PROSPECTS.

In a recent interview with the Montreal Gazette, Hon. E. P. Morris, Attorney-General of Newfoundland, thus referred to the future of the island's pulp and paper industry: "But it is in the manufacture of pulp and paper that Newfoundland must look for the sources of its crowning prosperity. The country is larger than Ireland, and contains millions of the best pulpwood in the world. I know this from experts who have ranged the forests of Norway and Canada, and the United States. At present the holders of large tracts of this land are negotiating with American and English capitalists for the establishment of paper and pulp mills. The enterprise cannot fail to be a success. With the proper growth of trees, splendid water powers, and labor acquainted with the requirements of such an industry, large dividends cannot fail to be a foregone conclusion."

W. D. Reid, vice-president of the Reid Newfoundland Co., has an equally firm faith in the island's destiny as a pulp and paper country. He says: "As an illustration of lumbering activity, I may say that five years ago there was little or no lumber exported from the colony, yet during the past year, the export was double the output of any previous year, and I think the output of 1904 will double that of 1903. Up to the present time, there are no pulp manufactures of any account, but I know of no country offering greater inducements for such an industry than Newfoundland. In the first place there are millions of acres of the very best pulpwood in the world, unsurpassed water powers, abundant shipping facilities, as the railway passes through the greater portion of these lands, and further, from the peculiar geographical shape of the island, being an irregular triangle indented with deep bays, there is no spot in its interior 50 miles from a deep water shipping port. When we take into consideration the enormous growth of newspapers and magazines, not to speak of the trade demands for paper, some slight idea may be had of what in the very near future, must come to Newfoundland in the way of a boom in pulp and paper manufacture. One or two large pulp and paper mills operated in their fullest capacity would equal in the value of the exports the present total export of the colony."

—The Dryden Board Co.'s application for a concession to cut pulpwood on the Wabigoon river, as reported last month, has been ratified by the Ontario Government, and work will soon be commenced.

Having accepted an engagement in Canada, William Killin has resigned his post of foreman at the Ryburndale Paper Mills, near Halifax. His successor is W. Ball, who was formerly one of the machine foremen at Cardiff. This is not Mr. Killin's first experience abroad, for he was in India, at the Punalur Paper Mills, Travancore, for some years.—Paper Maker.

PREFERENTIAL TARIFFS.

Although the paper trade of this country has not, apparently, benefited so largely as other industries, yet it is very evident from official statistics that the preferential tariff given by the Canadians on imported British manufactures has caused a considerable expansion in the general export trade of this country to Canada. With preferences on the part of Australia and New Zealand, there is every reason to believe that the British papermaker will greatly benefit, as the requirements of these particular markets are not, to any extent, met locally, as is largely the case with Canada. An advice from Melbourne states that Premier Deakin recently announced in the House of Representatives that the Federal Government was prepared to alter the tariff in favor of Great Britain, making sacrifices, if necessary, to secure reciprocal preferences. In no quarter has American competition been so severely felt by British paper exporters, particularly in "news," as in Australia, and with an alteration of the tariff in favor of Great Britain there can be no doubt that the Americans would be seriously affected In fact, it is admitted by New York exporters, that the imposition of a duty of say 20 per cent. on printing paper would shut out American paper from the Australian market. Already American shippers who formerly cultivated an export trade to New Zealand, complain that their business has fallen off materially. The Williamette Pulp and Paper Co., of Oregon City, Oregon, state that the difference of 20 per cent. in the duty has made it impossible for them to compete. They have been compelled to discontinue taking orders from former customers in New Zealand, and as a consequence they have found it necessary to discharge some of their work people. The question of reciprocal preferences is evidently not lost on the foreigner, who, perhaps, as time goes on, will show less disposition to ignore the country that buys so largely of his products. For instance, a suggestion is made by the manager of a Swedish paper mill that it may be beneficial for Sweden to buy from England instead of so largely from Germany. The latter country, it is pointed out, owing to a revised tariff, has practically precluded the importation of Swedish goods. Great Britain is Sweden's most important buyer of wood pulp, paper, boards, etc., and statistics show that in the matter of Sweden's imports, Germany overlaps England considerably. Considering the importance of the Scandinavian pulp and paper industry, our engineers, chemical manufacturers, felt manufacturers, and mill furnishers generally should find a good market in both Norway and Sweden, especially if the feeling of reciprocity is cultivated. The Svensk Pappers-Tidning, in supporting the suggestion of a Swedish paper mill manager for closer commercial relations between the two countries (especially as protection is being advocated in the United Kingdom), says: "It is a right principle to buy chiefly from those to whom one is allowed to sell, as far as this can be done without damage to one's own interest. This applies not only to individuals, but also to nations, and should be remembered not only in private life, but also in making commercial treaties. It is desirable that those interested should express themselves on this ques-

tion so that it should be discussed from different points of view."—World's Paper Trade Review.

NORTH-EASTERN CANADA.

By Henry Holgate, C.E., Montreal.

To the average Canadian and even to the tourist, the head of navigation on the Saguenay river is the "ultima thule" of eastern and north-eastern Canada, and the popular holiday trip up the Saguenay has for its greatest inducement the rugged wildness of the country, thoroughly impressing the visitor that unless he wishes to live in a tent, he had better not venture any farther eastward.

When one sees for the first time Tadousac, at the mouth of the Saguenay, and realizes that this was established as a settlement for commercial purposes in the year 1603, before the founding of Quebec, and notes the apparent desolation in all the surroundings, he naturally reasons that the tributary country is wanting in the necessary natural resources which tend to material development, and the thought may arise, did the intrepid and energetic early French and English explorers in their intense anxiety to discover the secrets of the west, overlook what they passed on the way up the St. Lawrence, for they certainly did not leave us any clear information of the country north and east of Tadousac.

No doubt these early explorers did well in pressing west, and even in the discoveries they made there the world was slow in realizing the fact, that the wilderness then made known was a veritable promised land, the outcome of which has been the firm establishment of a vast food producing area not dreamed of 50 years ago, and which has been brought so close to the world's markets by the development of systems of transportation, that its products are a source of such wealth to its people as promise soon to place their country in a position relatively stronger than other parts of Canada, and in a world-wide sense infinitely valuable.

So much for a so-named wilderness, and what can be developed from it, given at least three factors. 1st. Natural resources; 2nd, desirable immigrants, and 3rd, what will surely follow, adequate systems of transportation. Those who sail from Montreal or Quebec for European ports may think that they are more or less familiar with the St. Lawrence River and Gulf, but if they examine a map they will realize that their course is along the south shore, and but a dim, blue outline of the north shore is visible, and that only for a few hours, for the river broadens into the Gulf on such a grand scale that at a distance of 200 miles below Quebec, the river is 70 miles wide and all signs of land to the north soon disappear. The only way to get an idea of the nature of the north shore is to take one of the small local steamers plying along the coast, or to make the trip in a schooner, and a good navigator must be fortified with a vast amount of local knowledge to pilot his craft safely, for while the chief dangers to navigation have been provided with warning signals by the Government, there are many places that can only be rendered safe by like treatment, and no doubt the Government will keep pace with the improvements going on along the coast, and anticipate the needs of those engaged in business there.

The history, such as it is, relating to this country in the early period, is well known to your readers, Biarne, the Norseman, having been accredited as being the first European visitor in the year 990. Leif, Szkolney, Cabot, Denis, Aubert, Cortereal, Cartier, Roberval, and Champlain have assisted in making known this vast area, or at least the southern part, while Martin Frobisher, John Davis and Henry Hudson explored the northern limits.

In 1661 a French expedition reached Hudson's Bay, by way of the Saguenay and Rupert rivers, and in 1663 the Indians from Hudson's Bay began trading with the French at Quebec. In 1669 what is now the Hudson's Bay Company was chartered, and their first trading post was established at Rupert River, on

Hudson's Bay, in 1670. The voluminous relations of the Jesuits describe many wanderings into this vast area undertaken by these fearless pioneers. In 1685 a mica mine was worked on the East Maine river, and the history of the Hudson's Bay Company is worth the study of those interested in the very early development. In 1703 the French had more knowledge of the interior than had the English, as evidenced by the maps published, but the best information was very crude and inaccurate. In 1763 the southern and eastern coasts were placed under the jurisdiction of Newfoundland, and ten years later Canada resumed jurisdiction there. In 1809, Newfoundland again assumed part of this tract, and in 1876 the extent of jurisdiction was defined, and limited to the eastern coast line. For those who desire more minutely to follow the history of the exploration of this country, we would refer them to the reports of A. B. Blaiklock, 1860; Henry Yule Hind, 1862; Dr. A. S. Packard's "On the Labrador Coast," 1864; L. M. Turner, of the Smithsonian Institute, 1886; R. F. Holmes, Royal Geographical Society, 1887, and to the American Geological Society. Bulletin, Vol. 24. There are valuable reports also in the office of the Geological Survey of Canada dating from 1863, the later ones by A. P. Low being interesting and comprehensive.

(To be continued.)

—The North Shore Power, Railway and Navigation Company, of which Thomas Meaney is manager, will now resume construction work. Ten miles of railway have been completed and some progress made towards the construction of a dam and pulp mill.

—The machinery for the new paper mill to be built by J. R. Booth, Ottawa, has already been contracted for. The mill will take the entire output of his pulp mill, which will soon start operations, but construction will not proceed on the paper mill till the pulp mill is in shape.

—The Merritton mills started up on the 11th inst.

—Any reader having a spare copy of the first annual report of the Canadian Forestry Association, will confer a favor by forwarding it to the office of the Pulp and Paper Magazine, 18 Court St., Toronto. A reasonable price will be paid, for the purpose of completing a set.

—The Hamblet Machine Co., of Lawrence, Mass., has received and filled a large number of orders for its rotary paper cutters. Among the recent shipments were four cutters for the Rolland Paper Co., of St. Jerome, Que. Three of these are 44-inch machines, and one 62 inch. The company is now building a 112-inch cutter for the new paper mills of the Cornwall Mfg. Co., of Cornwall, Ont.

—The St. Raymond Paper Company has been incorporated, with headquarters in Montreal, to manufacture lumber, pulp, paper, etc.; capital, $500,000. The incorporators are: John McCaw, W. J. Buchanan, John Adair, J. P. Enwright, and B. W. Murison. The new company will take over the assets of the St. Raymond Co., having water powers and pulp mills at St. Raymond Station, described in our issue for June, 1903.

—A circular issued by the directors of the St. John Sulphite Pulp Co., Mispec, N.B., referred to elsewhere, states that in their judgment about £30,000 will be required to put the concern in shape, and they propose to raise the amount by 6 per cent. mortgage debentures, some of which they think will be taken up in Canada. These are now being offered, but if the plan does not succeed, the only alternative, they say, "is to place the company in voluntary liquidation, a result which would be disastrous to all concerned."

CONSTRUCTION OF PULP DIGESTERS.

The wide demands which are made on the digesters in cellulose factories require, and justly so, that the materials of which these most important apparatus of the cellulose manufacturing plant are constructed should require careful attention and their behaviour under different conditions be intelligently observed. As in any other boiler or boiling apparatus which produces steam or has boiling operations performed in it at pressures greater than that of the atmosphere, the first thing obviously about which there must be absolutely no doubt is the soundness of the plates employed in its construction. In addition to soundness, however, the toughness and durability of the plates, their ability to withstand the action of acids (particularly the liquors employed as the solvent in the boiling operation), as well as their resistance to external influences of temperature and rapid fluctuations thereof should all be most carefully determined. Boilers and digesters are generally made from one or other of the following materials: wrought or weldable iron, mild steel, or copper. Wrought or weldable iron is a product produced by what is known as puddling; it has an average tensile strength of 30 to 35 kilogrammes per square millimetre, about 18 per cent. of elongation, and is exceedingly tough. It is, however, owing to its manufacture, not completely homogeneous, a property which makes itself unpleasantly obvious in plates over 25 millimetres thick. Recently it has been more and more displaced in boiler construction by the second material, viz., mild steel. The same principles which govern boiler construction also hold good in the manufacture of large digesters, the more so as in indirectly heated digesters the circumstances are very much more favorable than in the case of a steam boiler where the walls are in direct contact with the flames. In addition to this, wrought iron behaves very unsatisfactorily towards water containing acids and the liquors used for boiling (a factor not to be underrated), being, probably owing to the small amount of carbon it contains compared with steel, attacked to a much greater extent than the latter, both by cold as well as hot liquors, and particularly by bisulphite liquor. Internal corrosion, the most fruitful cause of the explosions which digesters are liable to, happen much more frequently to those built of wrought-iron plates, and is also the starting-point of numerous other evils. This seems to be one of the most instructive guides in the choice of materials for digester construction. The term "steel" now includes in boiler practice all kinds of plate produced by rolling from ingots or blocks which are the final products of the Siemens-Martin process. This material, which, owing to its being obtained in a fluid state, is known, and more correctly so, as "ingot iron," is soft and tough, and contains slightly more carbon than wrought iron. It has an average tensile strength of 40 kilogrammes per square millimetre, about 20 per cent. of elongation, and is perfectly homogeneous. All these properties, compared with those of wrought iron, are undeniable technical advantages which make soft steel (Siemens-Martin steel or ingot iron) an eminently suitable material for boiler construction. This material is also largely used in the construction of marine boilers as well as stationary boilers, being extremely well suited for both on account of its many excellent qualities. Siemens-Martin steel being, as above mentioned, much less affected by acids and boiling liquors than wrought iron, it is obviously a preferable material for digesters, especially those of large dimensions. Recently, however, steel has been accused of behaving peculiarly under great fluctuations of temperature, which are always liable to happen, and in the case of large digesters subjected to great expansion under changes of temperature, may lead to fatal consequences. The peculiarity just mentioned, and which has been repeatedly observed both in steam boilers as well as digesters, is that the steel plates when

subjected to abnormally low temperatures or great differences of temperature show an inclination to give way both inside and out just at the rivet seams. Numerous boiler and digester explosions have been more or less rightly ascribed to this behaviour, which is apparently caused by structural changes in the composition of the material. The question, therefore, arises in the case of digesters built of this material: Must we put up with these peculiarities; have we no means of preventing them, and must we give up all the advantages of this otherwise admirable material and go back to wrought iron, which is both inferior and dearer, just to avoid the possible dangers above mentioned? I do not think such a course in any way necessary, as there are plenty of ways and means to protect the walls of digesters from all injurious influences. Digesters are always (or should be) built under a protecting roof and in properly enclosed spaces in which, even in the coldest mountainous countries, abnormal degrees of cold such as are hurtful to steel plates cannot continue for long in the rooms where the digesters are. This is only natural, as the heat radiated from the digester, the internal temperature of which is 80° to 85° C. and higher, materially assists, especially if the digester is not jacketted, in heating the digester house. The only things really that must be strictly avoided are direct strong and cold draughts on the uncovered walls of the digester. These may naturally be prevented in many ways, e.g., by fitting all the doors and other openings in the digester house with wind screens, or, what is still more effectual, jacketting the whole of the upper exterior of the digesters with some heat-insulating compound, such as lagging, straw ropes, felt, or the like. Perhaps the cheapest and most efficient method is to enclose the digester in a light wooden lagging of thin laths laid closely together and attached to wooden braces shaped to the outline of the digester, the whole being readily removable to allow of its being inspected at any time. If such precautions as these be taken, the injurious effects of sudden fluctuations of temperature on the digester walls will be prevented, and explosions which might otherwise take place avoided. It is obvious, of course, that the steel of which a new digester is to be built should be carefully examined as to all its properties, and it is to be strongly recommended that before a new digester is built samples should be taken from the plates which it is intended to use in its construction, and tested by some reliable testing institute (a Government one preferably) as to their strength, elasticity, toughness, and resistance to acids and the liquors used for pulp boiling. The samples must be taken from all the plates used in the construction of the digester, and must withstand: (1) A tensile test to determine the maximum tensile strength, elongation, and toughness of the plates; (2) cold and hot bending tests, particularly for the bottom plates, butt strips, and angle irons. When subjected to the tensile tests on the testing machine, plates up to 25 millimetres thick should show an average tensile strength of 35 kilogrammes per square millimetre, and not less than 20 per cent. elongation. Plates which do not come up to the above limits must be rejected. The samples subjected to the hot and cold bending tests must not show any signs of fracture on the crowns of the bends when bent both hot and cold into horseshoe form. Recently other kinds of steel, particularly steels with special additions thereto, such as nickel, etc., have been used not only for steam boilers, but also for digesters, and a great future has been prophesied for them. The chief advantages seem to be the greater strength of the plates (the strength of nickel steel being 60 to 65 kilogrammes and 20 per cent. elongation of special steel—so called—54 to 60 kilogrammes and 24 per cent. elongation), and the ability to economize in very large boilers and digesters by employing thinner plates. It is questionable, however, whether it is advisable to employ a material for the construction of digesters concerning the behaviour of which there is no very definite information as yet. Although these kinds of steel plates may be supe-

rior to our old trustworthy soft steel plates as regards strength, it is by no means certain that this superiority extends to all their other qualities, such as toughness, ability to resist low temperatures, trying differences of temperature, acids, boiling liquors, etc. Only when the results of actual experience have shown that all the special properties claimed for this material are really possessed by it can it be safely and confidently used for the construction of digesters. With regard to the last-named material, i.e., copper, it can only be used for building comparatively small digesters on account of its exceedingly high price. Copper has a strength of 25 kilogrammes per square millimetre, is very homogeneous and tough, and is scarcely affected by the boiling liquors at all. If it were only somewhat stronger and cheaper it would be an ideal material for digesters. Summing up all the facts above enumerated, it would appear that the best and most trustworthy raw material for digester construction which we possess at the present day is soft Martin steel or ingot iron, and it may confidently be said will remain so until all the other special kinds of steel which have appeared on the market have proved by actual results that they are all that is claimed for them—a matter which the future only can decide. The dislike which seems to have latterly gained ground among professionals to Martin steel plates for digesters is, I think, rather unjustifiable. To show how long-lived soft steel plates are, and how well they resist all destructive influences I will just cite one example of four cellulose digesters occurring in my own experience. These digesters are four metres in diameter and twelve metres in height, are built of the best Styrian Martin steel, and although they have been in use for eighteen years they have not, with the exception of internal corrosion and some trifling injuries, suffered any serious breakdowns, a success which must be ascribed solely to the material employed. I may also mention that these digesters are situated in a mountainous district of Austria where low temperatures in winter of 15° to 20° C. are not at all uncommon.—K. Rubricius, in Der Papierfabrikant.

WOOD PULP KEGS.

A company called the Patentwood Keg Syndicate has been formed in London, England, with a capital of £30,000, to exploit a process invented by G. E. Shaw, of Cincinnati, O., for making kegs out of waste paper. The manufacture of pulped kegs has hitherto always been based upon the principle of forming the material on steel rolls, but this method has proved unsatisfactory. By Mr. Shaw's process the waste paper or strawboard is beaten up into pulp and pumped into tanks, from thence flowing in regulated quantities into presses of special design, where it is subjected to hydraulic pressure, and then moulded into the desired form—either square, round, cone, or bilged—all in one piece, the bulk of the moisture being extracted in the process. The keg is then dried, turned on a lathe to remove inequalities, coated with special waterproof solution inside, and painted outside. The solution used is a secret, but it is said that it will withstand oils, turpentine, alkalies, and most neutral powders. The cover is a steel cap forced on by pressure. Kegs can be made of any shape or size, and, while possessing greater strength and durability, are produced at one-half the cost of manufacture of the existing type of oak kegs, and can, it is claimed, be used over and over again without deterioration. It is said they are now being adopted largely in the States by manufacturers of white lead, paints, etc.

JAPANESE PAPERS.

Without any doubt the paper made from Mitsumata bark, in Japan, is the most wonderful manufactured. The papers used by the common people of Japan are immeasurably more varied than with us. They form one of the important economics in the life of the peas-

ant, and it is such ingenious uses of plant material as this employment of the bark of a shrub that makes it possible for forty-two million Japanese to live on the produce of a cultivated area half the size of New Brunswick.

The walls of the Japanese houses are modern wooden frame covered with thin paper, which keeps out the wind and lets in the light.

The oiled papers are astonishingly cheap and durable. As a cover for his load of tea, when a rainstorm overtakes him, the Japanese farmer spreads over it a tough, pliable cover of oiled paper, which is as impervious as a tarpaulin and as tight as a gossamer. He has doubtless carried this cover for years, neatly packed away about his cart. The "riksha" coolies in the large cities wear rain mantles of this oiled paper, which cost less than eighteen cents and last for a year or more with constant use. An oiled tissue paper, which is as tough as writing paper, is used for wrapping up delicate articles. Every farmhouse has its supply of wrapping paper which has been in use for several years and seems as strong and flexible as ever. It has been tanned with the fermented juice of green persimmons and made into "shibu gami," which is more impervious to moisture than ordinary paper, and much tougher.

In the tea factories the piles of paper sacks filled with tea are made of "shibu gami," and 8-year-old sacks covered with paper patches are a common sight. It is said that these tanned sacks keep the tea in better condition than any other sort, and that they last with careful use for many years. Grain and meal sacks are almost always made of this same paper in Japan, for it is not easily penetrated by weevils and other insects.

But perhaps the most remarkable of all the papers which find a common use in the Japanese household are the leather papers of which the tobacco pouches and paper cases are made. They are almost as tough as French kid, so translucent that one can nearly see through them, and as pliable and soft as calfskin. These tobacco pouches quite change one's notions of the characteristics of paper, for the material of which they are made is as thick as cardboard, but as flexible as kid. The Mitsumata plant, from which practically all these papers are made, is a pretty, decorative shrub with branching stems, light green leaves and delicate, yellow flowers. Only the bark is used in paper making. As a rule, the shrub is cultivated on lands which are unfit for rice growing and other cultivation, steep hillsides and on top of hills. The plant will grow in almost any soil, but good drainage is a requisite for the growth of the plant in the wet climate of Japan. The Japanese strip the bark from the shrub by hand, but as the wood is soft, it could not be done with machinery much more easily. As the shrub will not stand cold weather, the department says it could not be planted where the thermometer sinks below 10 degrees, and as it requires moisture, it would not do well on the plains. The department says the cultivation of the plant could furnish the farmers of the south a new and valuable crop.

THE USES OF PULP.

In addition to the great use of wood for the manufacture of wood pulp, there has arisen since the seventies a new branch of the industry, viz., that of the conversion of wood into cellulose. This substance served primarily as a substitute for rags and cotton in the manufacture of many kinds of paper, and its advent must have been hailed with the liveliest satisfaction by the whole world, seeing that ultimately the supply of cotton was not sufficient for the large quantities of paper required.

Science and research, however, revealed new methods for converting the stable cellulose into a whole series of important industrial products, the cellulose fibre being transformed either by mechanical or chemical treatment into new products, which have recently acquired an importance in the commercial

world hitherto undreamed of. New products are continually being obtained from cellulose, and attempts are continually being made to discover further useful methods of application. The following brief sketch of the uses and methods of application of cellulose as far as they interest the members of the paper, pasteboard, and wood pulp trades, may perhaps awaken an increased interest in them, and perhaps prompt individual efforts to help to add to the general fabric of this most important branch of industry.

The cellulose obtained by various methods from wood and woody plants is, as is well known employed for all sorts of paper and articles manufactured therefrom. The purest and most completely opened up form of cellulose fibre is, however, that contained in cotton and wadding, and the manufacture of wadding and filter paper are special branches which demand the greatest care and the most scrupulous cleanliness both in the materials and water used. Both the above products are put to a number of uses, and one of the most important qualities demanded of them is high absorptive power, as well as freedom from every possible impurity. In addition to their use for filtering and surgical purposes, these pure forms of cellulose have been largely employed of late years in the manufacture of nitro-cellulose, which substance is again worked up into a variety of important technical compounds, principally gun-cotton, blasting gelatine, smokeless powders, celluloid, and collodion, from which latter substance the so-called artificial silk is now produced.

The cellulose fibre produced from wool is still more absorptive than that obtained from cotton, and, as the result of much laborious research and experiment, it has now become possible to produce wood cellulose which can take the place of cotton cellulose, a fact which has opened up an entirely new market for the article, and one which is also increasing. Both filter paper and wadding for surgical dressings can now be made of good quality from wood cellulose, an achievement hitherto impossible. Both by mechanical, as well as chemical treatment, a whole series of valuable products may be obtained from cellulose, some of which may be briefly mentioned.

Various solvents are employed which enable cellulose to be treated more conveniently. When the pure fibre is boiled with water, preferably under pressure, the cellulose dissolves, and there is first produced a dissolved hydro-cellulose, which can be subsequently converted into dextrin and sugar, and finally into alcohol by fermentation. This takes place much in the same way as with ordinary starch, which is also transformed into dextrin and then into sugar when boiled. The simplest molecular chemical composition is exactly the same, both in the case of cellulose and starch, namely, $C_6 H_{10} O_5$; hence both have the same chemical appearance. This molecular composition, which is not yet, unfortunately, accurately known, may also be very much higher, e.g., $C_{12} H_{20} O_{10}$, i.e., $(C_6 H_{10} O_5)_2$ or may even be $C_6 H_{10} O_5 n$ times.

If now, therefore, as already mentioned, cellulose be treated with water for a prolonged period of time at a temperature of, say, 40 deg. C., a dissolved hydro-cellulose will be produced which, when the solution is evaporated and allowed to cool, remains as a uniform horny mass, which may be molded into any shape by pressure, and is used and known under the name of "Cellulith." Cellulose is also dissolved by various acids, such as hydro-chloric, sulphuric, nitric, and acetic acids, also by acetates. Alkalies, too, such as potash and soda, salts like zinc chloride, ammoniacal oxide of copper, and others all dissolve cellulose. The pure cellulose dissolved in any of the above reagents can be recovered again by precipitation, and, on the various methods of treatment, it is generally a mixture of hydro-cellulose and oxy-cellulose which has to be dealt with.

The comparatively ready solution of cellulose in water, acids, solutions of

salts, etc., is the cause of the high percentage of loss which occurs in the manufacture of wood cellulose, the cellulose being all dissolved in the waste liquors, first as hydro-cellulose and oxy-cellulose, which are subsequently converted into various other compounds by the acids and salts present in the liquors. The separation, isolation, and utilization of these products has not yet, unfortunately, been satisfactorily accomplished. If cellulose be treated for a prolonged period of time with concentrated hydro-chloric acid, it dissolves, and can be recovered again as a pure amorphous powder by precipitation. It swells readily, and is used to some extent in chemistry and by druggists. If sulphuric acid be added to cellulose, it gradually dissolves as hydro-cellulose; but if the treatment be prolonged, preferably with the aid of heat, complete decomposition ensues and dextrin is first produced and then sugar, free sulphuric acid being separated.

The treatment of cellulose with sulphuric acid has become an exceedingly important branch of industry, the well-known so-called parchment paper being produced in this manner. The process is extremely simple, the paper is drawn slowly through a bath of sulphuric acid, the action of which is to cause the cellulose fibres first to swell and then to dissolve. Owing to their high absorptive power they quickly saturate themselves with the acid, but as the action of the acid does not last long, and is only limited, the paper, after leaving the bath and having been thoroughly washed is now a tough, gelatinous substance and is known as parchment paper.

Another substitute for parchment now widely used is "Pergamin," a thin transparent grease-proof paper produced by mechanical means and possessing properties similar to real parchment. For papers of this class the cellulose is, in technical parlance, ground "short," or more correctly, ground to a very smooth, slimy paste, from which the above-described kind of paper is made in the usual way. The chemical reaction is practically the same in this case as in the treatment with sulphuric acid, the fibres being gradually converted into hydro-cellulose by the prolonged mechanical treatment and the complete disintegration, which both confer upon it the properties above described.

Similar properties to those possessed by parchment and the so-called "Cellulith" can be obtained by treating strips of cellulose with a solution of zinc chloride and subsequently washing and drying them. This also produces a certain amount of hydro-cellulose.

If the strips which have been treated with zinc chloride be piled on top of each other and immediately subjected to a heavy pressure, a supple and tough substance which can be made of all strengths will be obtained, the precise nature depending upon the method of treatment and its duration. This substance is commonly known as vulcanized or hard fibre, is extensively manufactured, principally in America, is exceedingly durable and elastic, and can be worked like wood, being readily turned, cut, sawn, or drilled. These convenient properties enable it to take the place of rubber and leather, and since it does not expand or contract, nor possess other undesirable qualities, it is largely used for packings, tubes, valves, wheels, rollers, stamps, plates, and the like. A hindrance to its still more extensive use is that as yet the cost of manufacture renders it too expensive for some purposes.—Dr. B., in Holzstoff Zeitung.

BRITISH AND GERMAN PAPER PRODUCTION.

A very low estimate is formed in Germany of the annual production of paper in Great Britain, says the World's Paper Trade Review. The report of the Association of German Paper Makers for 1902-03 is quoted by the Wochenblatt as giving the total British paper production as 450,000 tons. In dealing with the production in Germany, it is stated that Guntter-Staib's Directory records 400

machines, twenty-eight mills making hand made paper and 476 board mills. In 1897 the total production of German mills was stated to be 600,000 tons of paper and 170,000 tons of boards. In 1892, according to Professor Kirschner, the German production of paper and boards was 1,000,000 tons, which, it is claimed, has since increased. The information given by the German Paper Makers' Association is very misleading. Although there are no official returns to serve as a guide in computing the production of paper in Great Britain, the subject, however, has been ventilated and discussed in the pages of the World's Paper Trade Review. Even in 1890 Geo. Chater, an excellent authority, in giving evidence before the Board of Trade on railway rates, gave the annual production of paper in the United Kingdom as 520,000 tons. In an article published in our issue of February 16th, 1900, we presented a number of figures as to the production of paper in this country, and the result obtained was that machine made paper, including boards, amounted to 943,000 tons per annum. The consumption, owing to excess of imports over exports, is greatly above that quantity. The present production of Great Britain can safely be estimated at 1,000,000 tons

MECHANICAL WOOD PULP.*

By Stanislas Gagne, B.A., Sc.

(Continued from last issue.)

Grinding.—What constitutes the mechanical process of "pulping" wood is the grinding operation instead of a "cooking" with chemicals; hence if mechanical wood pulp is badly ground it will be inferior in quality no matter how well other operations have been performed. We have seen before that wood is an agglomeration of fibres, and the object of grinding is to derive from that agglomeration a pulp or a soft mass of particles that will have the proper qualities for paper making, namely, that it will be long, thin, flexible and felt well. To attain this end we have several kinds of grinders which differ but little in principle. Fig. 12 illustrates the principle of an ordinary grinder. We have first a stone A. against which the sticks or bolts of wood, with their longitudinal axes parallel to the shaft turning the stone, are pressed in pockets B. by hydraulic pressure on pistons C. in cylinders D. These stones, which must be composed of very small and sharp grains and have a certain strength to resist the centrifugal force caused by revolving at a high speed, are quarried out of sand stone and turned to required diameters, Some good stones are quarried in Nova Scotia, but the best ones are said to be those derived from certain districts in England.

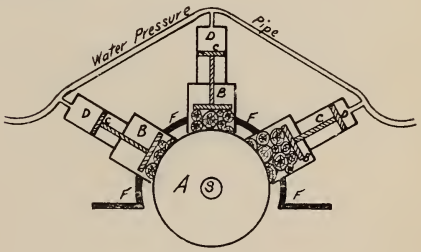


Fig. 12

Sectional Elevation of GRINDER

A, stone; B, pocket; C, piston; D, cylinder; F, frame; S, shaft.

Grinders.—Taking the Port Henry Grinder, built by the Jenckes Machine Co., of Sherbrooke, Que., as a typical example of the kind which is used in Canada, the following is a general description of the machine: Fig. 18 shows a cut of it, and the name of the chief parts may be obtained by referring to Fig. 12. The shaft, which is very large, is made of hammered, soft steel, and on both sides of the stone are threads on which the flanges are screwed. These flanges which are about 38 inches in diameter, are faced where they come into contact with the

*The above paper won the first prize given by the publishers of the Pulp and Paper Magazine for the best student's paper presented to the Canadian Society of Civil Engineers for 1903, the judges being members of the Society.

stone (see Fig. 13); threads are cut right and left, and they weigh about 800 lbs. each. This grinder which is so made as to take stones from 50 to 54 inches in diameter, and 18 to 26 inches wide, can grind until the stone

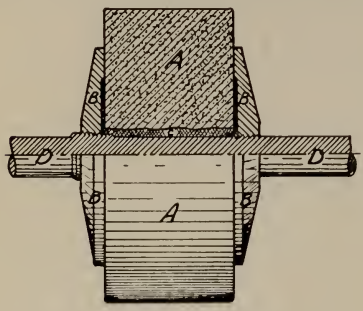


Fig. 13 Stone & Flanges

A, stone; B, flanges, C, Cement; D, shaft.

is reduced to about 40 inches in diameter. The main shaft boxes or bearings are self-adjustable and quickly conform themselves to any variation in the shaft. The length of the box is about 18 inches, wood lined for bearings in water, or babbitted boxes are sometimes used with them. The pockets are made in one piece, 2 inches in thickness, and can be closely adjusted to the stone so that very few splinters can pass through unground. The middle pocket will take wood 16 inches in diameter, and the two side ones, 14 inches in diameter, hence the use of a splitter is largely dispensed with. The pockets are raised or lowered in the sides, on planed surfaces, by two 2-inch soft steel screws (S.). The doors for the pockets are of soft steel plate, and slide up and down in a groove in the pocket. The pocket followers are provided with strips cast on the lower side to prevent the wood from rolling in the pockets. The cylinders are made of iron, lined with brass, and have heads accurately fitted to them. The lower heads connect direct to the top of the pockets, and are provided with doors on the back and front, which are easily removed when lower packing glands of piston rods require adjusting or re-packing.

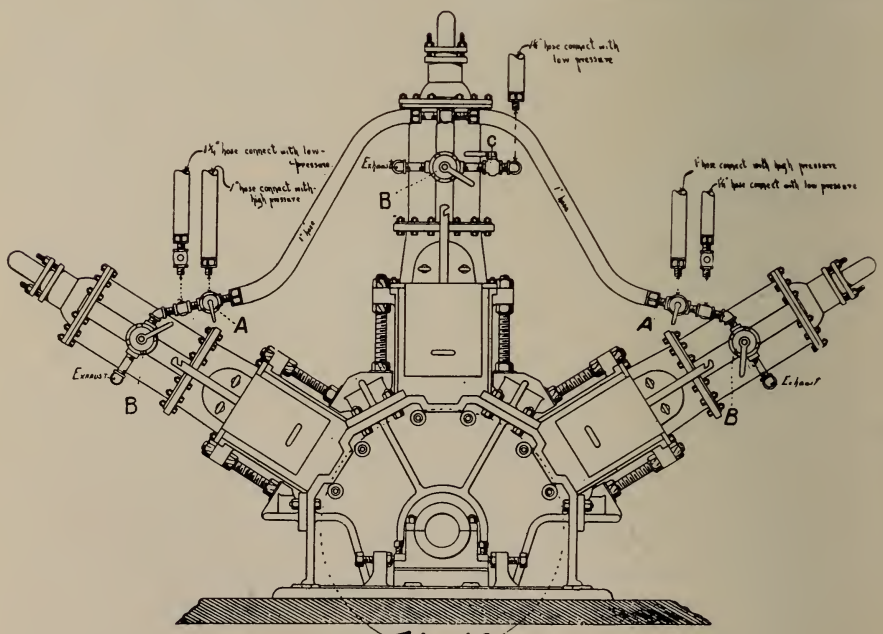


Fig. 18

Fig. 18—Port Henry Pulp Grinder.

Operation of new piping system

(PATENTED).—Referring to Fig. 18, suppose the two side pockets are grinding under high pressure, and that one of the side pockets needs refilling; the centre pocket is then idle, but by changing the three-way valve A. the high pressure is thrown on to the centre pocket and causes it to grind under high pressure. The empty side pocket being now relieved, the low pressure of water, automatically opens the check valve and acts upon the piston lifting the pocket follower from the stone. The pocket is then refilled. The valve B. is shifted, allowing the low pressure to bring the piston down until the wood is pressed firmly against the stone. At this point, the three-way valve is turned so that the high pressure water is diverted from the centre pocket and enters on the top of the piston, at the same time automatically closing the low pressure check valve. The centre pocket is now idle, and if the other side pocket requires refilling, it is done in a manner similar to the above. If not, and if the centre pocket should require refilling, the follower of the centre pocket is lifted from the stone by means of valve B., which is always connected with the lower pressure, the pocket is refilled with the low pressure again introduced into the cylinder above the piston. In this manner, as above stated, the

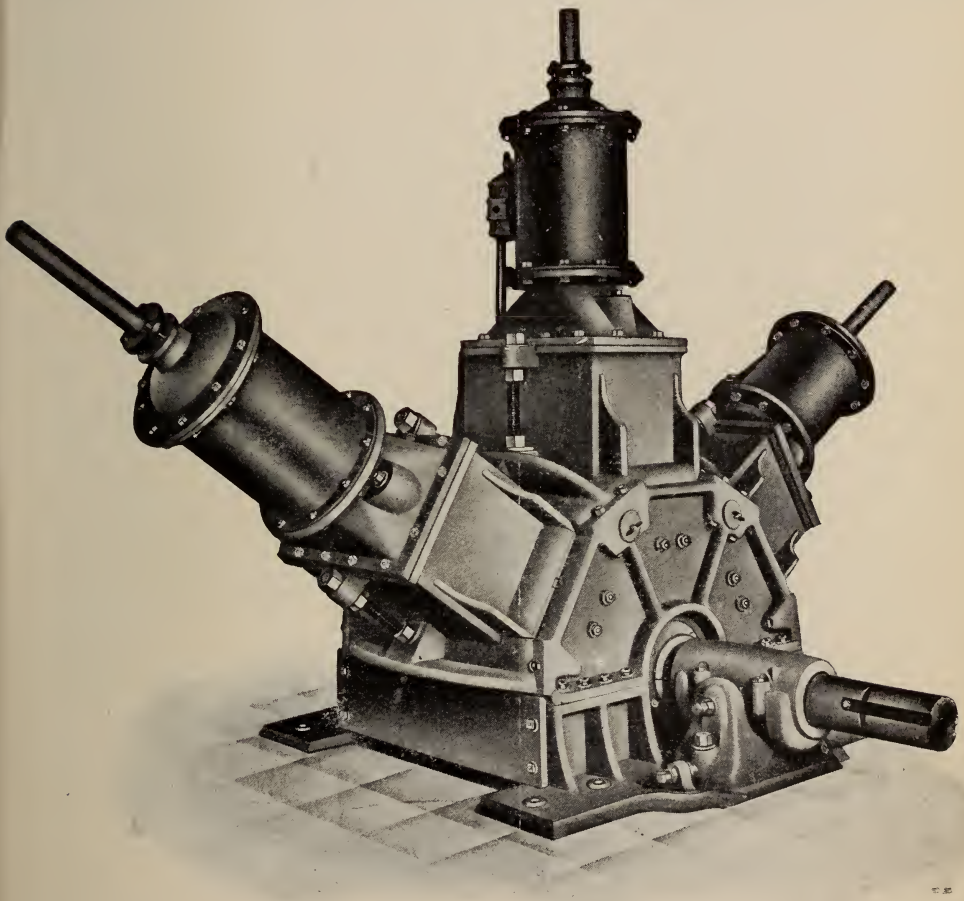
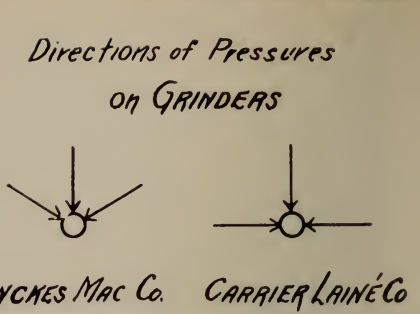


Fig. 19—New Success Pulp Grinder.

cylinders are always filled with water at a high or low pressure, consequently, when the three-way valves are shifted there is no loss of time before the pockets begin to grind, and the grinder is thus always in action. Fig. 19 is a view of the grinder built by the Waterous Engine Works Co., Ltd., of Brantford, Ont. As will be noticed the general outline is the same as the Port Henry, and differs only from it in details. The grinder built by Carrier, Laine & Co., of Levis, Que., differs from these above mentioned as seen by Fig.



Approximate direction of pressure in the Port Henry type.

Same in the Carrier, Laine & Co. type.

Fig. 20—Pulp grinder, manufactured by Carrier, Laine & Co.

20. Its construction allows the pulp to remain longer around the stone, which is run with part of the lower side in pulp and water, while those others are usually intended to run clear of the water underneath. The directions of the pressure of the stone of the latter is not the same as on those others, more distance being allowed between the pockets. Some objections are made to this method of distributing the pockets, because the horizontal thrust on the bearings from one of the side pockets, when the other is not grinding is so great that it quickly wears out the bearing; and they say that the more vertical the resultant pressure is the better for the bearing.

OPERATION OF GRINDERS.

Stone Setting.—Stones usually run direct on the turbine shaft, so as to eliminate the loss of power caused by belting or gearing and are coupled to it by means of two flanges, which screw in opposite directions on the shaft, as described before, and so arranged that the pressure on the revolving stone will tend to tighten the flanges and not loosen them. Care is taken to centre the stone properly, and when the flanges are screwed up tight, cement is poured in around the shaft and between the stone and the flanges, by grooves and holes in the flanges for that purpose, to fill all the space that may be left, so that the stone may be set tightly everywhere.

Some claim that it is an improvement to bolt the stone and flanges by one-inch bolts running through the stone from side to side, their reason being that this adds to the strength and solidity of the stone and prevents it from bursting. Others who have tried them, discarded them because they claim that they cause the stone to break; one reason for this is that the stone is bound to slip sometime when heavy pressure is suddenly applied; this it cannot do if it is bolted tight and the flanges cannot screw any more, and the only alternative left to the stone is to break.

Turning.—This is done by means of an arrangement represented in Fig. 21. The Fig. B is pressed against the revolving stone, where it requires turning and is actuated by a screw and hand wheel. The stones are usually thus dressed with a slight crown at the centre, or with the edges slightly rounded off to prevent sprawling of the stone.

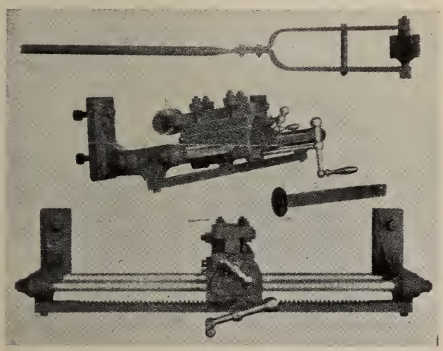


Fig. 21—Stone-turning device for "Success" Pulp Grinder.

Great care is taken that no cracks are made in the stone which would cause it to fly off when revolving under pressure.

Sharpening.—This is the next operation and a very delicate one it is. In most cases the value of the pulp depends on the skill with which it is performed, as may readily be seen. A perfect sharpening would be one that the surface of the stone would be composed of a large number of very small sharp points or projections which would detach the fibres one by one. In actual practice opinions vary greatly as to how to produce a good sharpening. In nearly every case a steel jig or burr, about 3-in. wide and 3-in. in diameter, with pyramidal projections numbering 16 to 100 per sq. inch, is used, but it is in the use of that jig that opinions vary so much. Some manufacturers employ two jigs, a close pointed one, so as to make even cuts, being passed over the surface, which is afterwards somewhat smoothened down with a coarser jig. Others make use of but one jig, usually a close, pointed one, which is passed several times over the surface, until the latter is judged in proper shape. What seems to be a reasonable method is to pass a sharp and rather close-pointed jig (with say 100 projections per square inch), quickly across the surface of the revolving stone so that it will not pass over the same surface twice, thereby causing an even surface of about 100 projections to the square inch on the stone. Dull jigs should not be used as they make pits instead of sharp projections. If the stone has been sharpened too much, a brick or a plane surface stone is used to smoothen it. Some stones will sharpen by use instead of dulling, in which case they must be smoothed instead of sharpened. The frequency of sharpening depends mainly on the quality of the stone and on the speed and pressure used; for an ordinary English stone with a 50 to 75 lbs.' pressure per square inch in the cylinders, and a speed of 225 R.P.M. twice a week in summer and once a day in winter is a fair average. After sharpening, the stone is washed to remove all the loose grains of sand and then is ready for operation. The pockets are filled with wood and turbines started.

Speed.—Some maintain that the maximum production of a grinder occurs when the stone revolves at a speed of 175 to 200 R.P.M. while others claim that a speed between 225 and 250 R.P.M. with an ordinary 44 to 50-inch stone produces the best results. Which is

right? The result only tells. Assuming the same sharpness of the stone and the same pressure on the wood, the production increases with the speed up to a certain point and then decreases, and the quality of the pulp also increases up to a certain point and then decreases, but the quality is decreasing when the production still continues increasing. If the speed is too low, the pulp will be coarse, and if too high it will be mealy and short. To find the correct point, both in speed and presure, a careful examination must be made and several tests of the products must be applied. An ordinary grinder, with a 50-inch stone, using 24 inch bolts and turning at a speed of 200 to 225 R.P.M. with a pressure of 60 to 75 lbs. per square inch in the cylinder, corresponding to a pressure of 15 to 18 lbs. per square inch on the grinding surface, will require 300 to 350-h.p. to produce five tons of air dry pulp per 24 hours. With 500-h.p., a pressure of 100 to 125 lbs. per square inch and 200 R.P.M., it will produce 7 to 8 tons in the same period. The side plates of the pockets should be set down as close to the stone as possible to prevent chips and splinters from passing through unground. The supply of water required to keep the stone at the proper temperature and to wash down the pulp is usually introduced from a spray at the top and must be carefully attended to. When the lower part of the stone runs into a vat partially full of pulp and water, the spray must be just enough to wash the pulp down. This water should be so regulated that the stone is kept at a rather high temperature (about 100 degrees Fah.), which causes the grinding to be more easily accomplished, hence the output to be increased. In cases where the mill is stopped for repairs or for Sunday, care should be taken that the stone is allowed to cool slowly, and, if the lower part runs in water, that the water is drained off so that the stone may cool evenly. The reason why stones crack and fly off when running is resumed may sometimes be looked for in the neglect of such details. Sometimes the wood jams in the pockets, thus relieving the pressure on the stone which then ceases grinding the wood in that pocket; in that case it is only necessary to remove the pressure and loosen the wood by means of a short bar. The undersides of the followers should have strips cast on them so as to prevent wood from rolling in the pockets, as seen in the case of the Port Henry grinder. An ordinary good English stone properly handled and operated lasts about a year and wears down in ordinary grinders from 54 to 40 inches. If several stones are coupled directly on the turbine shaft, as in case of Fig 10, each one has its shaft length which shafts are all equal and held together by ordinary couplings. All mills should be provided with extra shaft lengths and at least one ready mounted stone; thus, when a stone anywhere on the shaft has to be changed or replaced, the turbines are stopped only the time necessary to uncouple the old stone and replace it with the ready mounted one, which requires but a short time. All grinders used in Canada are of the horizontal running type, as described. In some other countries, however, vertical types are used and the grinding is done cold. Other types have also been invented but so far as the writer knows none have yet proved to be more economical and practical than the present one.

Pumps.—At least four sets of pumps are necessary for an ordinary exporting pulp mill: 1st. High pressure pumps for the cylinders of the grinders. 2nd. Low pressure pumps for backing cylinder pistons for sprays on the stones and in screens and wet machines and various other uses. 3rd. Stuff pumps to convey the ground pulp from the tanks under the grinders to the screens, and 4th. High pressure pumps for the presses. In case of a mill deriving its power from a high head, the number of pumps may be reduced to the last two, pressure direct from the flume or water pipe being used instead of the first two.

1st. Pump for Cylinders of Grinders. —Ordinary triplex power pumps are

used, the sizes varying with the work to be done. At least two are employed and are so arranged that if one fails, the other will do the work without any of the grinders being stopped. They are usually driven by means of a belt from the turbine shaft, and thus, the pressure varying with the speed, they will act somewhat as a governor if desired. If a constant pressure is wanted an accumulator is used to regulate it.

2nd. Low Pressure Pumps.—The same type as the one above mentioned, but built lighter will answer the purpose.

3rd. Stuff Pumps. As the turbines must be set as near the tail race as possible (in most cases not higher than about 15 ft.), the ground pulp must be pumped up to the screen above the wet machines. This wet pulp falls from the grinders into tanks or troughs running along and under the grinders, and is conveyed by gravity to one or several reservoirs from which the stuff pumps take it. On account of the usually low head to be overcome and of their simplicity and freedom from valves, centrifugal pumps are the best adapted for this purpose. Ordinary stuff pumps are sometimes used.

4th. High Pressure Pumps for Presses. —These will be considered later.

(To be continued.)

LAURENTIDES NATIONAL PARK.

A Summary of a Paper Read before the Canadian Forestry Association by W. C. J. Hall, Department of Lands, Mines and Forestry, Quebec.

This extensive reservation consists of a territory situated partly in three counties, Quebec, Montmorenci and Charlevoix, to the north of the city of Quebec, comprising 2,640 square miles, or, say, nearly 1,700,000 acres, and was created a park by Act of Legislature on the 12th of January, 1895. In brief, the boundaries are as follows: On the north, the 48th parallel; on the east, the St. Urbain Road; on the south and south-east the rear line of the Seigniory of Beaupré and the twelfth and thirteenth ranges of Stoneham and Tewkesbury; and on the west of the Fief Hubert and an imaginary line running to a point west of Grand Lake Batiscan, thence skirting the Quebec and Lake St. John Railway to the intersection of the 48th parallel. The objects of the park are: The protection of the forests, fish and game; the maintenance of the water supply, and the encouragement of the study and culture of forest trees. An appropriate selection of territory was made for the furtherance of these objects. Over a dozen large rivers take their rise in the interior of the park, which is remote from the lines of colonization, and has always been celebrated as a hunting and fishing ground.

Touching upon the forests of the park and their protection, it is well to make clear the point that the cutting of timber within the boundaries is not prohibited. On the contrary, a large area is under license, and some of these limits are being operated upon at the present time, e.g., in the valley of Batiscan. So far the limit holders have removed only mature growth, which system of cutting, when properly controlled, eventually improves the forests and induces a faster and healthier growth of the residue. Again, these operations are now, and for a great length of time will be, confined to the cutting of spruce, fir and pine, leaving the hardwoods intact. But should at any time the nucleus of forest growth in the park be threatened with extinction, legislation of a special nature could be enacted to modify the rights of licensees, and thus preserve the territory for all time in forest. However, the topography is of such a character that the contingency above cited is unlikely to occur. Altogether, we have under license in the park some 2,300 square miles, and it is quite possible that the whole area will eventually be taken up. I am prepared to admit that the carrying on of lumbering operations on a tract is not conducive to improvement in the fishing and hunting thereon, but take

this ground that as timber is the staple product of the country, it would be unwise to throw any obstacles in the way, particularly as the fish and game under such conditions reassert themselves after a reasonable lapse of time when the cut-over areas are left unmolested. Protection as regards fire is, perhaps, more easily accomplished in the park than elsewhere. The park and club guardians exercise a judicious patrol, lumbermen are possibly more careful, and members of clubs see to it that their guides and other men employed take proper precautions. At all events, it is gratifying to be able to state that no forest fires of any consequence have occurred in the park since its creation, and any burning that has taken place did not start within its boundaries. Perhaps the fact that the whole area is withdrawn from sale, and the consequent total absence of settlers, can be attributed as a reason for immunity from the fiery elements. Moreover, as there is no line of railway closer at any point than, say, five miles, the park is also relieved of this fruitful source of forest fires.

MAINTENANCE OF WATER SUPPLY.

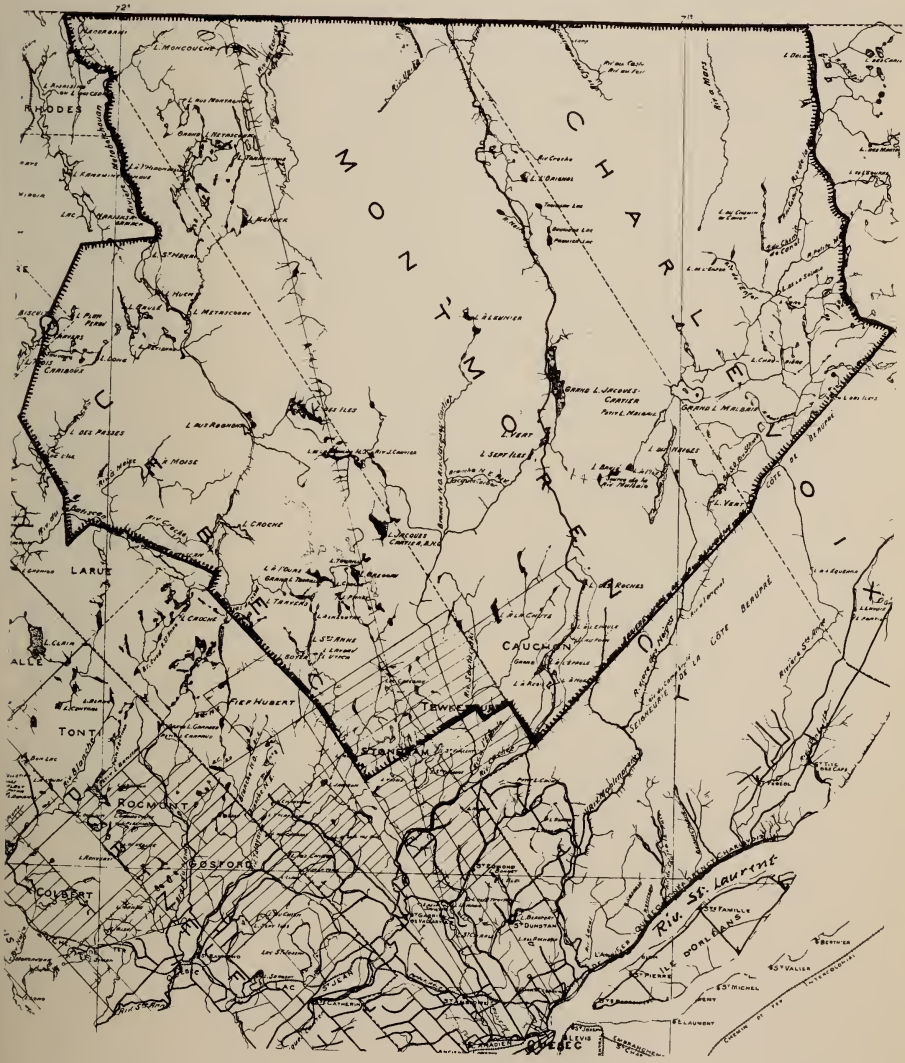
The authorities made a judicious selection of territory in order to furnish an example of the good results attendant upon preserving in forest the sources and valleys of rivers. From the interior of the park streams radiate to all points of the compass: the Metabetchouan, Upika, Upikauba, Cyriac, à Mars to the north and north-east; the Murray to the eastward; the Ste. Anne de Beaupre and Montmorenci to the south; the Ste. Anne de la Pérade and Jacques Cartier to the south-west; the Batiscan, inclining still more to the west, and the Bostonnais waters running nearly due west to the St. Maurice. The year 1903 is a period of time which affords students of forestry an opportunity of testing the claims made that the preservation of forest at the sources of rivers and along their banks results in a comparatively well-sustained and even water supply, and this on account of the general drought which occurred last year. Let us sum up results. We find that the drives on the rivers of the north shore of the St. Lawrence all came out. It is necessary to remark here that, except in cases of some small streams, the head waters of rivers on the north are all wooded. South of the St. Lawrence, in Quebec Province, the sources of rivers are, of course, to the south, but many rivers take their rise in settled districts, or very near thereto, and are to a greater or lesser extent settled along their banks. The drives on the rivers of the south shore in a great many instances were either only partially successful, or even less, except in the Gaspé Peninsula on the southern watershed.

Naturally a thickly settled country and forests are not found occupying the same area. Would it not, however, be possible under such circumstances to maintain a timber belt at least along the water courses? Some years ago a disastrous landslide, accompanied by loss of life, took place at St. Albans, on the River Ste. Anne. A large area became loosened by copious rain, and slid right into the river, practically changing its course. Investigation showed that the surface soil was underlaid by a bed of blue clay. There being no forest growth, the rain had permeated the surface, lubricated, as it were, the substratum, and thus released and set in motion the whole mass, causing devastation, and worse. Now, had there been a narrow belt of timber along the banks it is questionable if such a disaster would have occurred. I think that the trees, firmly gripping the surface, and their roots forming a network reaching deep down into the soil, would have prevented the banks from giving way under the pressure. Can any of us cite instances of landslides on anything like a scale such as this occurring in wooded districts? At all events, here is a river, partly in the park, partly outside; on that portion situated within you may look in vain for evidences of extensive landslides, whereas on the part outside, being destitute of forest, this eminently disastrous one occurred.

The park, whilst not being selected for the wealth of its forests, carries a fair stand of timber, the predominating varie-

ties being three in number, viz., the spruces, fir, and the birches. A partial list of trees indigenous to the territory would comprise alder, basswood, birch (white, yellow and black) cedar, beech, cherry, ash, maple, spruce, white pine, red pine, cypress, poplar, butternut, elm, giving a total of three billion feet, consisting mainly of timber which could be operated under the existing system. No means have as yet been employed for exploiting the deciduous growth.

It must be admitted that the park is a



tamarack, fir and willow, but doubtless on closer investigation a number of others could be found. A conservative estimate, making allowance for water, old burnings, barren ground, etc., would give 1,000,000 acres of timbered territory, and upon this one could safely figure on 3,000 feet, board measure, to the acre,

well-watered area, and it is graphically described by one person as "peppered" with lakes. Within its boundaries there are some large sheets of water, e.g., Grand Lake Batiscan, Grand Lake Jacques Cartier, Lake Jacques Cartier West, Lake Croche, Lake Moise, Grand Lake Malbaie, Snow Lake, Lake aux

Ecorces, Netascouac, des Passes, and others.

After describing the fish and game of the park, the author goes on to say that large portions of the park, particularly those lands bordering the outskirts, are under lease to various clubs, each lease stipulating for the employment, the year round, of a guardian satisfactory to the Government. He thought clubs were protectors of forest, fish and game, their interests being identical with those of the Government.

THE CARIBOU BARRENS.

Apparently there has never been any forest growth on this area, which comprises between 150 and 200 square miles. True, little clumps of spruce and cypress exist here and there, but they never attain to any size from the commercial point of view. The extensive barren patches are covered with what is said to be "Lichen rangifernia," and in summer the surface is fairly hard, crunching under one's feet like snow. Immediately underneath the surface there is an excessive amount of moisture, even in a drought. Lying to the west of these Barrens is a large area, which many years ago was completely burnt over, the forest being absolutely exterminated. In summer the caribou resort to this tract, presumably to feed on herbs, etc., along the watercourses and around the lakes, but the moment winter comes on and there is snow in the Barrens, they flock to this latter place and feed upon this moss, or lichen, apparently finding no difficulty in pawing away the snow covering, even when the same is very deep. Therefore, there must be something peculiar in the formation to cause the animals to frequent this area at certain seasons only.

THE INFLUENCE OF SPECULATION IN PULP TIMBER LIMITS.

At a meeting of the Quebec Colonization Commission, last month, the malign influence of the speculator in pulpwood limits was shown by Francis P. Buck, president and general manager of the Royal Paper Company, who said that owing to the acquisition by speculators of valuable timber lots in the limits held by the company, its operations were seriously crippled, because the American shareholders had taken alarm and refused to put more money in the concern to enable it to extend its business, and its bankers were not easy to deal with. The consequence is that the building of a mechanical pulp mill and a newspaper mill with an estimated expenditure of over a quarter of a million dollars is seriously delayed. When asked what remedy he would propose, Mr. Buck said: "The only thing I can suggest is a heavy export duty on pulpwood. If this is done, and the limit holders are amply protected in their limits, they could get possession of the American market." It was brought out in evidence that one firm had been suffering from the practice complained of by the loss of 20,000 acres withdrawn from its limits, and had reason to deprecate the possible loss of 21,000 acres more. The actual pecuniary damage to themselves was estimated at $100,000, and the prospective damage $150,000. He further said: A heavy duty on pulpwood would lead to more factories being built here, for I am satisfied that the Americans must have either our pulpwood or our pulp."

SCANDINAVIAN TRADE.

C. E. Sontum, Canadian agent in Scandinavia, writing from Christiania, in March, says: As usual, during war periods, the market for wood pulp and paper has become stronger. Pulp manufacturers are holding back and not offering so freely, in expectation of a further increase in the prices, as there are many enquiries in the market. I learn that a parcel of 600 tons for delivery during 1904 has been sold at a price equal to £40 6s. per ton net f.o.b. (including agent's commission), and that a bid of £38 10s. per ton f.o.b. (including commission) for a parcel of 1,500 tons has been refused. Cellulose continues go-

ing up, the value, f.o.b., Scandinavian ports may now be quoted at £6 18s. 8d. for "strong" and £7 10s. 8d. for "easy bleaching," or fully 11 shillings more than a year ago. I mention this in the interest of the Canadian exporters, so they may know what the Norwegian shippers ask at present, and I may add, there has been considerable enquiry from the United States lately for prompt shipment. I am just back from the business trip referred to in my last report, to the principal cities of Sweden and Denmark, and to Hamburg. I am pleased to say that I succeeded in interesting different firms for Canadian manufacturers. The importers on this side seem to have quite a different opinion about Canada's ability to compete both in quality of goods and in prices than they had some years ago.

NEW PULP SCREEN.

Napoleon Richard, Sherbrooke, Que., has been granted a patent in Canada and the United States for improvements in pulp screening machines. Figure 1 is an end elevation of a machine constructed in accordance with this invention. Fig. 2 is a side elevation of the same. Figs. 3 and 4 are views in elevation of details of the construction.

In the drawings, A represents the frame of a pulp-screening machine, upon which is supported the pulp-box A^1, which is hinged to the frame, so as to permit of its being raised or lifted up when it is necessary. The floor of the pulp-box is provided with removable screens *a*, beneath which are arranged the diaphragms *a'*, which are connected to the standards a^2, of which there may be any suitable number. The lower end of the standard a^2 is provided with a casing B, which is preferably rectangular in shape and is provided with removable face *b*, removably secured to the casing B by any suitable means, such as screws. The lower part of the casing B is open, and in the upper portion is arranged an adjusting plate *b'*, which is adapted to rest upon a bearing-block of lignum-vitæ or other suitable material b^2, which is loosely held in said casing and projects, through the open end so as to rest upon the cam-disk D. The adjusting plate *b'* is provided with two adjusting screws b^3, which are threaded through the upper portion of the casing B, whereby the bearing-block b^2 may be properly adjusted to compensate for wear.

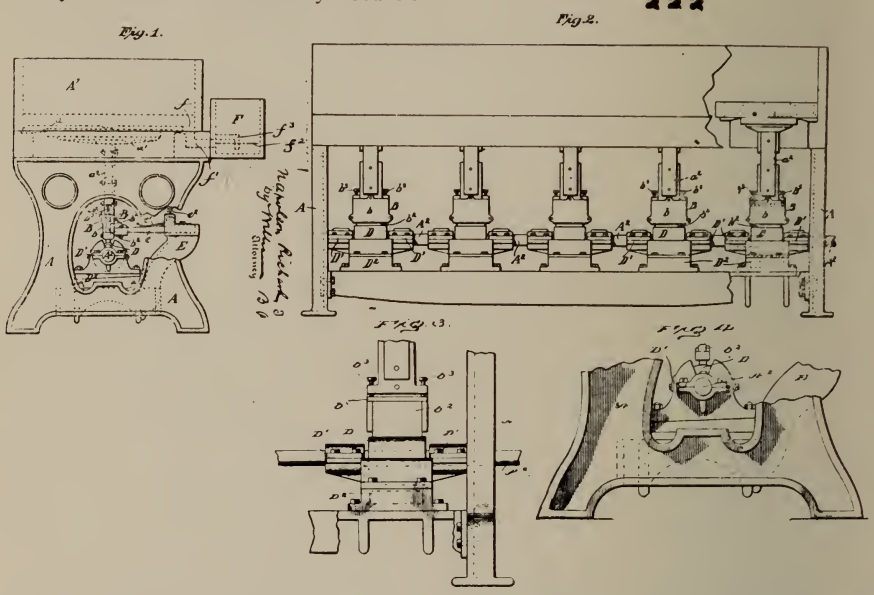
The bearing-block b^2 will always be held in contact with the face of the cam-disk D and can be constantly adjusted to compensate for uneven wear, and when worn out can be readily removed without stopping or otherwise interfering with the operation of the entire machine and a new bearing-block substituted.

The cam-disk D is fixed upon the shaft A^2, which is journaled in an ordinary two-part bearing-box D', which rests upon and is supported by the pillow block D^2. The pillow-block D^2 is removably held to the frame A by means of suitable threaded bolts and is similarly secured to the bearing-box D'. The upper face of the pillow-block is beveled transversely, so that when the securing-bolts are removed it may be readily removed by a slight blow with a hammer, whereupon the bearing-box D' may be taken from the shaft and the friction-packing removed and replaced when required without stopping the entire machine or interfering with its action, as is necessary with the ordinary type of machine now in use.

The importance of the improvements above described will be appreciated when it is remembered that in machines of this type there are usually five diaphragms with their standards and bearing-blocks working on the cam-disks fixed upon one shaft. The constant hard service wears the bearing blocks quickly and unevenly, necessitating frequent repairs and adjustments. In the old type of machine, the adjustment or replacement of a single bearing-block was a matter of considerable work and necessitated the stopping of the entire machine with its five diaphragms, thus causing trouble, loss

of time, and considerable expense. By means of the construction, above described, the necessary repairs and adjustments can be easily and quickly made by an unskilled operator and entails the stopping of only one diaphragm.

The frame A is provided with an upwardly-extending arm E at a point opposite each standard a^1 upon the upper extremity of which is removably secured



a wooden spring-bar e, the other end of which is removably secured to the rear face of the casing B, the purpose of which is to maintain the constant contact of the bearing block with the cam-disk. Bearing upon the upper portion of the spring-bar e is a metal reinforcing-spring e', suitably secured to the upper portion of the arm E. A suitable set-screw e^2 is threaded in a bracket formed on the arm E and serves to regulate the tension of the spring-bar e, as required in an obvious manner.

The diaphragm a' is provided near one edge with a long and narrow slot f, which communicates with a passage f' formed in one of the supporting-timbers of the frame and which leads into a flow-box F, mounted upon the side of the frame of the machine. The flow-box is of a capacity suited to the size of each screen, and is provided with a suitable outlet. At a convenient point between the outlet and the passage f' is fixed a partition f^2 of a height sufficient to always retain in the flow-box a quantity of pulp, within which is immersed the end of a box-cover f^3, which covers the opening of the passage f' and forms a liquid seal to prevent the back-flow of air therein.

THE NEWS PRINT QUESTION IN CONGRESS.

In the House of Representatives this month, Representative Lilley brought up a resolution calling for an investigation, through the Department of Commerce and Labor, of the famine of news print. The following is an abstract of the discussion in committee: Don C. Seitz, of the New York World, and John Norris, business manager of the New York Times, were heard. Both stated that the International Paper Company and the General Paper Company had divided the United States between them in the control of news print paper. They said that the International controlled all that section east of the Indiana line, and the General Company the territory west of that line. The combination, it was testified, had raised the price of news paper

during the last four years fourteen dollars a ton, and during the past year as much as five dollars a ton; it was selling paper in London, counting the freight and insurance, at thirty per cent. less than it did in New York.

Mr. Seitz declared that when the paper trust was formed it took over nearly all of the independent mills at prices not warranted by the condition of the property. It had $55,000,000 invested in plants not worth over $25,000,000, and was charging prices for paper to pay dividends on the larger amount. Mr. Norris stated that the trust even dictated in one instance the size of the paper a newspaper should use, thereby prescribing the kind of press that should be operated.

The reduction of the tariff on wood pulp and paper was suggested by Representative De Armond as a remedy. Mr. Seitz answered that although himself a Democrat, he had understood that the tariff was not to be disturbed at present, and he believed there was enough evidence of the illegality of the combination to proceed against it under the Sherman anti-trust law.

Mr. Jenkins (chairman) asked if any request for such proceeding had been made to the Attorney-General, or for an investigation of the Secretary of Commerce and Labor. The answer was in the negative. It was believed that the proper way to proceed was by a resolution directing an investigation by the Department of Commerce and Labor, the result of which might be used by the Attorney-General in proceedings under the law.

Mr. Norris took the view that the removal of the tariff from wood pulp, amounting to one dollar and sixty-seven cents a ton, would enable the construction of independent mills within six months which could compete with the trust.

Mr. Seitz described the condition of the newspaper publisher as one of peculiar hardship. It was impossible under existing conditions either to raise the price of the paper to the subscribers or the price of advertising. In New York, he said, the publisher was being squeezed by the paper trust on one side, by the labor combinations on another, and by a recently formed dry goods combination on another. The latter was succeeding in reducing the price of advertising. Many of the great New York dailies, he said, would face an actual deficit in the next year or two, unless relief was forthcoming.

The committee took no action on the resolution.

Mill Matters

The erection of the Oriental Power and Pulp Co.'s mill, at Swanson Bay, B.C., will be commenced this spring. It will cost in the neighborhood of $1,000,000. All the output has been contracted for.

The North Shore Power, Railway and Navigation Co. will resume construction work on their pulp mill, dam and other improvements as soon as navigation opens. Ten miles of railway have already been built.

The Metabetchouan Pulp Co. will build a mill at St. Andre, this spring, with nine grinders. A dam 464 feet long and 27 feet high has already been built, which will furnish 7,000-h.p. A daily output of 30 tons of cardboard is expected. The company has 175 square miles of gray and black spruce on the river, twelve miles from St. Andre, and will be able to purchase considerable pulp wood, in addition, from the settlers who are clearing the land.

The Private Bills Committee of the House of Commons, at Ottawa, has recommended the granting of incorporation to the Cascapedia Manufacturing and Trading Co., to engage in the lumber and pulp business in the County of Bonaventure. The promoters are: S. E. McLean and Hugh McLean, of Buffalo; A. J. H. Eckardt, of Toronto; W. C. Edwards and John A. Cameron, of Rockland, and Gordon C. Edwards, of

Ottawa. They have purchased 400 miles of pulp and timber limits in Bonaventure, their authorized capital is $2,500,000.

It is reported that the St. John Lumber Co., Van Buren, N.B., will have a pulp mill, operating in connection with the lumber mill, within twelve months.

By a party vote, the House Committee, at Washington, on Ways and Means voted down motions to favorably report bills placing salt, coal, hides, wood pulp, and other articles on the free list.

The Chicoutimi Pulp Company has applied for an act which will enable them 1st, to ratify the deed of agreement between that company and the Jonquieres Pulp Company; 2nd, to ratify an issue by that company, of bonds to the amount of $400,000, authorized by a previous act and approved by the shareholders of that company, the deed of trust between the company and the Royal Trust Company creating mortgage on the property of the former for the security of the said bonds, and the title to the ownership of the property mortgaged.

The development of the pulp industry has been the cause of a considerable mileage of railway in Canada, which on purely agricultural or mineral account would not have been thought of for many years. The Algoma Central is now built far enough to serve the pulp mills at Sault Ste. Marie from the sources of their timber supply. The line to Temiscaming, the Nepigon line, and the Manitou and North Shore Railway would probably not have been opened if the pulp industry had not sprung up. The pulp industry, says the Paper Makers' Monthly Journal, can fairly be said to have been the means of causing other important industrial developments in Canada.

The 1904 calendar issued by the Philadelphia Clay Mfg. Co., of Philadelphia, Pa., was a serviceable one. It shows a half-tone view of the company's extensive plant and mines, which are located at Toland, Pa. The claim of the company that this is the largest clay mine and washing plant in the world seems to be well founded. The product is 150 tons of clay daily, which, coupled with the fact that they have their own siding, connecting with the Reading and Pennsylvania systems, enables them to make prompt shipments at all times. Clarence Beebe, the company's representative, in speaking of trade, says: "We have had an excellent year's business, and anticipate a good new year's business. We have heard from a good many new paper manufacturers since the first of the year and are arranging to supply them with our clay."

A Quebec charter has been granted to the Beauce Pulp and Lumber Company, with a capital of $150,000, headquarters at the City of Quebec, to manufacture, buy and sell lumber, pulpwood, pulp, paper; to operate electric works, etc. The charter members are: Horace Richardson Goodday, merchant, of Quebec; Hubert Clifford Foy, merchant, of Saint Columban of Sillery; Cecil Andreas Foy, merchant, of Scotts, County of Dorchester; Gordon Crammond Blair, clerk; and William Arthur Goodday, clerk, both of Quebec.

The Union Screen Plate Co., of Canada, announce the removal of their Canadian works and office to Lennoxville, Que. This concern believed that there was a good field for an up-to-date screen plate factory in Canada, and about a year ago leased property in Sherbrooke and began the manufacture there of their famous "Union" Bronze and Rolled Brass Screen Plates. They have recently erected a modern building of their own at Lennoxville, and have now completed the transfer of their machinery to their new quarters. The new plant is equipped with both steam and electric power, either of which is sufficient for the full capacity of the works. The Union Screen Plate Co., whose chief works are at Fitchburg, Mass., are the largest manufacturers of screen plates in the world, and guarantee practically immediate delivery of the largest orders. In addition to the manufacture and repair of screen plates, this company will make a specialty of brass and union bronze sulphite castings, as they have a first-class brass foundry at their new Canadian works.

The Kinleith Paper Co., of St. Catharines, has won in its dispute with the paper makers, who went out on strike some time ago. The mill is now running full time, most of the strikers being replaced by new hands.

The Riordon Paper Co.'s sulphite mill, at Hawkesbury, Ont., is in operation again, after being shut down for two months. New machinery has recently been installed, making it one of the largest mills in Canada, having six digesters. The pulpwood to keep it supplied is driven down the Rouge river.

In the Superior Court of Quebec, on the 12th inst., the case of J. Savoie vs. the Brompton Pulp and Paper Company, was opened. It is an action for damages claimed to have been suffered in consequence of the building of a dam by the company, which raised the level of the water in the St. Francis river. Some forty witnesses are to be examined.

The Paper Mill is authority for the statement that Lafleur, McDougall & McFarlane have filed an action on behalf of John Cook, of Fraserville, for the recovery of $25,000 from the Canada Paper Company. The plaintiff claims that he bought stock holdings and interest which the company possessed in the Fraserville concern, at Riviere du Loup, and by virtue of a contract signed April 12th, 1901, he was entitled to use the water power till 1901, the time at which the lease expired. He paid $25,000 in cash after the contract was signed, but now seeks to recover that amount from the company, alleging that they have not carried out the terms of the contract, and are not in a position to do so at present.

The latest development in the affairs of the Acadia Pulp and Paper Co., of Nova Scotia, is the effort to sell the mills. On the 8th inst., at the suit of the Indian and General Trust, Limited, the high sheriff of Halifax offered for sale several properties of the company in the County of Queen's and Halifax. The properties included, besides the mills, land at Milton, Herring Cover, Lake Middleton, Six Miles Lake, Rossignol, Liverpool, Nine Miles, Eight Miles and Ten Miles Lakes, and Upper Lake in Queen's County and properties at Shad Bay, Halifax County. The trust company started the bidding at $50,000, but as no bids followed, and as the court had put in a reserve bid, the sale was declared off. Under authority of the administrators, one of the mills is running on stocks of wood already at the mill, the pulp being shipped to the States whenever the market shows a profit on transactions; but no shipments are being made to Great Britain as prices do not warrant exports. Under present arrangements, the mill can be closed down whenever operations cease to be profitable.

DISASTROUS FIRE.

As we go to press we have to report a disastrous fire in Toronto prevailing through the whole of the night of the 19th inst., and practically wiping out the wholesale paper and stationery district. Among those burnt out are the Toronto warehouses of the following paper mills: Canada Paper Co., the E. B. Eddy Co., Kinleith Paper Co., Ritchie & Ramsay, and Lincoln Paper Co., with the following stationers, lithographers, and printers: Brown Bros., Rolph, Smith & Co., Addison & Mainprice, Davis & Henderson, W. J. Gage & Co., Book Supply Co., Copp, Clark Co., Warwick Bros. & Rutter, Carter-Crume Co., J. L. Morrison & Co., Blackhall & Co., Kilgour & Co., Buntin, Reid & Co., Barber & Ellis Co. The following are some of the losses reported: Brown Bros. $300,000, insurance $250,000; W. J. Gage & Co., $200,000, insurance $150,000; Copp, Clark Co., $200,000, insurance $175,000; Warwick Bros. & Rutter, $200,000, insurance $150,000; Buntin, Reid & Co., $200,000, insurance $150,000.

"Shadower," in the Paper Maker, London, gives his opinion of the affairs of the St. John Sulphite Pulp Co., as follows: The directors of the St. John Sulphite Pulp Company are making an

effort to raise a further £30,000 to carry on their mill at Mispec, N.B. The result of the mill's working, up to recently, has been anything but satisfactory. However, it appears that the new manager reports a substantial rise in sulphite pulp, and a decrease in the price for pulpwood. He also informs the directors that he has cancelled some contracts, and renewed them at a higher figure. Consequently, there is a chance of a profit being made. I sincerely trust that this may turn out to be true; but I still maintain that there is a great difficulty in carrying on a manufacturing business in Canada with the directorate in Scotland. The best thing to do would be to get some St. John men to put up a third of the new capital, and then elect two of those with the best business experience and capacity to serve as resident directors. Then, with such well experienced and practical men as J. Galloway, W. Dixon, and Philip Grossett to co-operate from this side, success, I feel, would be assured.

In an interview the other day, C. W. Rantoul, general manager of the Imperial Paper Mills, Sturgeon Falls, said: "The output of our mills, which is of the best quality of newspaper, is shipped to Australia, England and the States. In the company's yard are 12,000 cords of spruce wood for the manufacture of the pulp and in addition to that we have taken out 15,000 cords this winter, which will be driven down the river as soon as the ice disappears. Since the starting of the mills the town of Sturgeon Falls has shown a rapid growth. The present population is 2,200; there are many new buildings and preparations on a large scale are being made for others. The town is most progressive for its size. It has public waterworks, a drainage system is being introduced and there is an electric light and telephone service. It is very likely that the coming season will see a great increase in the town, owing to the fact that the company are planning to more than double the paper mill plant and erect a sulphite plant for the manufacture of sulphite fibre."

Geo. Mackay, president of the International Brotherhood of Paper Makers, visited the local union at Windsor Mills, Que., a few days ago, and during his visit a one year's agreement was entered into between the local union and the manager of the Canada Paper Co.

In connection with the guarantee by the Ontario Government of bonds of the Lake Superior Co., a statement of the affairs of the various concerns taken over by the new company was made by the officers. That portion of the statement relating to the Sault Ste. Marie Pulp and Paper Company, is as follows: Ground wood pulp mill, capacity 86 tons daily, $181,348.40. Ground wood pulp mill, tools and machinery, $327,683.49. Sulphite pulp mill, capacity 60 tons daily, $328,281.89. Sulphite pulp mill, tools and machinery, right to cut pulpwood, $217,751.02. Boiler house, $6.077.05. Paper bag mill, in Michigan Power building, completed. Also makes building paper, utilizing only waste pulp from both pulp mills for its full capacity, $23,323.81. Warehouse, at Sault Ste. Marie, Ont., $16.330.10. Total, $1,100,895.76.

The Canadian Government Office, London, England, has an enquiry from a firm of paper exporters, who wish to get into touch with Canadian stationery houses with the object of introducing a speciality.

—The world's annual production of paper is estimated at 1,812,500 tons, contributed by 3,986 paper mills. The consumption of paper is the highest in Great Britain, averaging 17.25 pounds a year. The United States follows, with 14.25 pounds; Germany, with 11 pounds; France, with 10.5 pounds; Italy and Austria, with 5 pounds each, and Spain, with 2.03 pounds. The world's annual consumption of news is 417,750 tons, an increase of 137,500 tons during the past ten years.

RAG AND PAPER STOCK MARKET.

Montreal, April 16th, 1904.

There is not much change to report in the paper stock market during the last month. The supply of cotton rags, in all grades, is scarce, and a good demand continues, especially for blues and thirds. The accumulations of waste paper held till recently have moved out, some of the mills in this vicinity having turned on to roofing and sheathing paper. Manila rope is weaker, and little doing. No sales of bagging to report. New cotton cuttings of all kinds are in active demand; a large proportion of them are being shipped to American writing mills.

Now that the spring floods are about over, most of the paper mills in this vicinity are busy on full orders, and likely to be so for the next two months.

Domestic white rags	$2.00 to	$2.10	per 100
Mixed bagging	55 to	65	"
Blues and thirds	1.25 to	1.30	"
Dark cottons	75 to	90	"
Roofing paper stock..	50 to	55	"
Waste papers	35 to	45	"
Hard white shavings.	2.00 to	2.10	"
Soft white shavings..	1.00 to	1.50	"
Book stock	75 to	90	"
Manilla rope	1.75 to	2.00	"
Sisal and jute string	75 to	1.00	"
Flax tow	1.10 to	1.25	"

(See page 15.)

CHEMICAL MARKETS.

The World's Paper Trade Review reports a fair demand for chemicals, and quotes as follows: Ammonia alkali, 58 per cent., stands at from £4 10s. to £4 15s. per ton on rails at works; bleaching powder (soft wood), £4 5s. to £4 10s.; caustic soda, 76-77 per cent., £10 10s. to £10 15s.; soda crystals, £2 17s. 6d. to £3 2s. 6d.; salt cake, £1 17s. 6d. f.o.b. Liverpool; alum, £5 to £5 5s.; and recovered sulphur, £5 5s. to £5 10s. Sulphate of alumina and blanc fixé steady at unchanged prices. There is a good demand for China clay and French chalk.

In New York high test alkali is reported at 77½c. for light, and 80c. for dense, and domestic china clay, $8.50 to $10; bleaching powder at $1.25 and over.

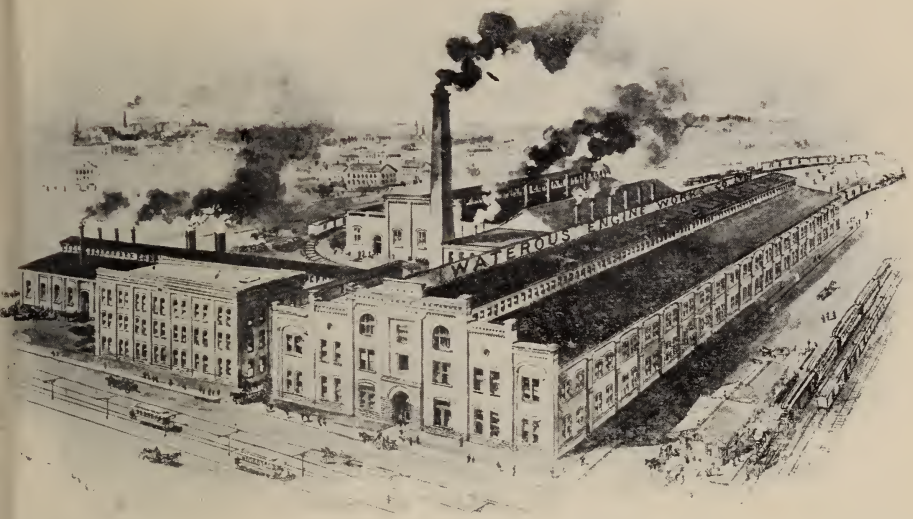
Reviewing the gradual rise in the price of raw material in the United States for several years past, the Paper Trade

(See page 20.)

Journal says: There have been recent sales of rossed Canadian spruce at figures that will place the cost of the wood at the American pulp mill at $11 to $12 a cord. This is a very high cost. It is a price which, if it should be general and permanent, would compel either further economies in the operating of paper mills or an increase in the price of paper. That is a point that is very clear to paper manufacturers, and later will be made clear to paper consumers. Pulpwood buyers are adopting various expedients to keep prices down, but notwithstanding all their efforts each year's stock costs more than its predecessor. The soda fibre men, dependent chiefly on poplar for their work, have been and are yet in bad shape as to their wood supply. Because of inability to get wood, owing to the high price of labor, because of its better employment in getting out wood for other industries, many soda fibre mills in February almost entirely suspended operations, and some did suspend entirely. The situation has not changed materially, and soda fibre may be expected to hold its present value firmly.

In the eight months ending with February, the United States imported pulp from Canada to the amount of 70,231 tons, valued at $1,271,504, compared with 50,853 tons, valued at $1,265,117 in

(See page 22.)



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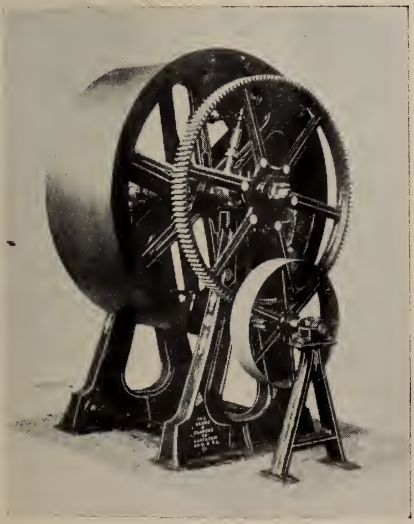

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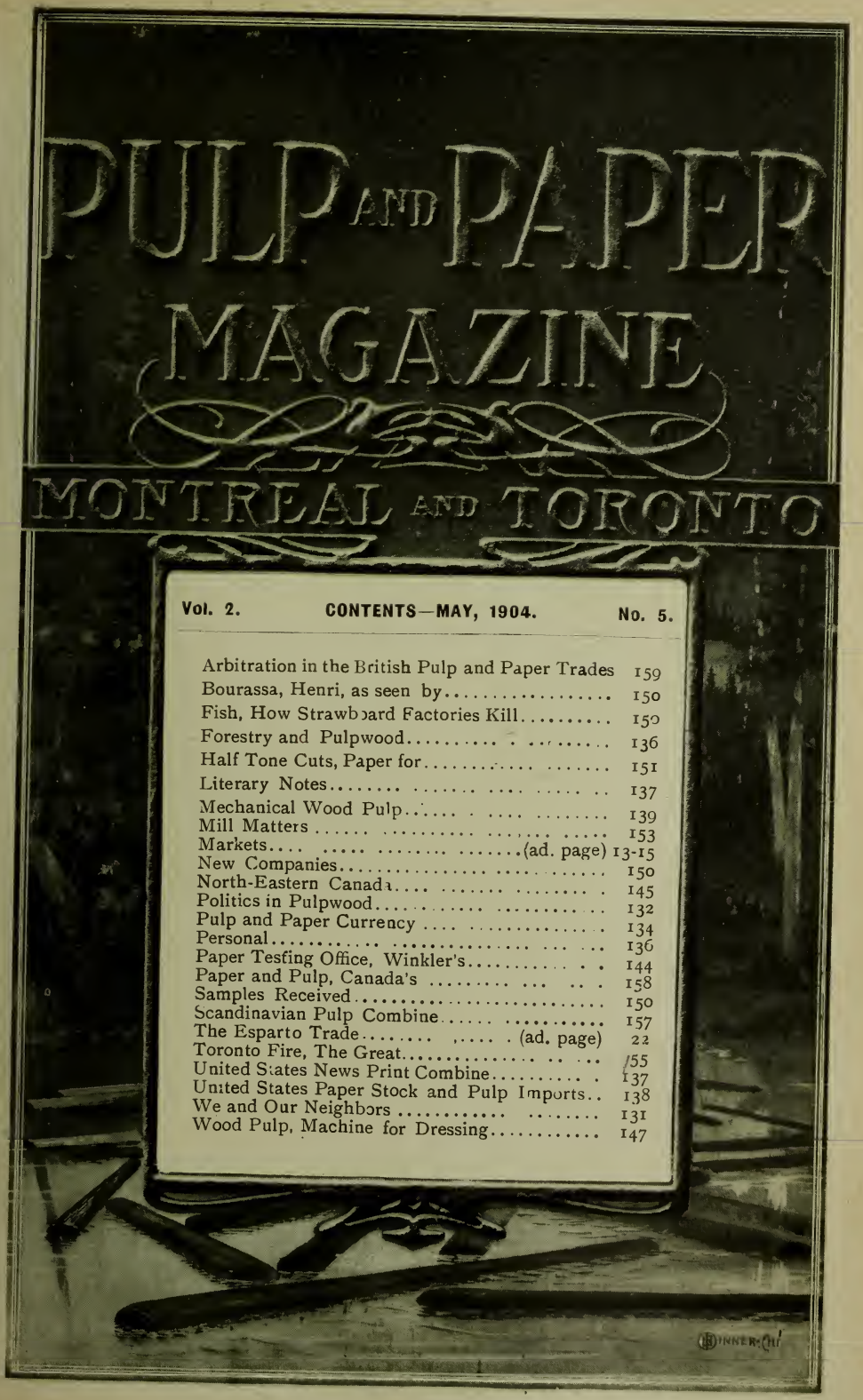
the same period of 1903, and 31,950 tons, valued at $845,970, in the eight months of 1902. It will be noted that there has been a great increase in the three years not only in the amounts, but in the relative value per ton. The imports from Canada are likely to be much larger this year than ever recorded, and this country is now the chief source of supply for United States mills, Germany supplying in the eight months named only 6,255 tons, and all the rest of the world only 18,479 tons.

PULP AND PAPER MARKETS.

The situation has materially improved since last month from the operating standpoint. There is now plenty of water and power in all parts of Canada and the States, and there have been few serious troubles from floods in Ontario or Quebec. Though production has increased, prices of pulp have remained firm, and in the case of papers some lines have advanced. In the States, the International Paper Company made an advance on manila a few days ago, and other companies are following the example.

Ground wood is quoted in New York at $15 to $18 f.o.b. at mills. In Canada $13 is being paid and producers are not anxious to book at that, as some purchasers are willing to pay $14. Last year the rate for ground wood here stood at $12, but it is not likely to go below $13 this year. Sulphite and rag papers will also maintain their present level, it is thought. Bleached sulphite is quoted in New York at $2.50 to $3 per cwt., unbleached at $1.85 to $3.12½; soda fibre, $2.25 to $2.35. In Canada, sulphite is quoted at $1.89 to $1.95.

In Great Britain the following were quotations in the first week of April: Sulphite, bleached, per ton, £11 10s. to £12; unbleached, first quality, £8 15s. to £9; second quality, £7 15s. to £8. Soda fibre, first quality, £7 10s. to £7 15s.; seconds, £7 to £7 5s



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INDEX TO ADVERTISEMENTS.

The J. C. Wilson Co., at Lachute, Que., is increasing its equipment by changing a cylinder for a Harper-Fourdrinier machine, which will enable it to double its output of manila paper.

* * *

In the large cities of Japan a sort of mackintosh made of oiled paper costing less than 18 cents is worn by the coolies, who draw rickshaws in the streets. These men, exposed to all weather, wear the cloaks constantly, and notwithstanding their incredible cheapness they will last a year or more.

THE
PULP AND PAPER MAGAZINE OF CANADA

VOL. 2.—NO. 5. TORONTO, MAY, 1904. $1 A YEAR. SINGLE COPY 10c.

Pulp and Paper Magazine

A monthly magazine devoted to the interests of Canadian pulp and paper manufacturers and the paper trade issued between the 10th and 15th of each month.

SUBSCRIPTIONS: Canada, Great Britain and the United States, $1 a year; to Foreign Countries, 5s. a year.

Changes of advertisements should be in the publishers hands not later than the 1st of the month, and, where proofs are required, four days earlier. Cuts should be sent to the Toronto office, by mail, not by express.

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WE AND OUR NEIGHBORS.

If men who control the public policy of Canada and the United States could get together and frankly discuss the industrial relations of the two countries, conceding to each other a fair scope for the advantages which Nature has given to each, the trade of "the continent to which we belong" would be enormously increased between its northern and southern halves. Such development as takes place now goes on in spite of artificial hindrances of tariff legislation. If, for instance, there were absolute free trade in pulpwood, pulp and paper, there would be a vast increase of pulp and paper manufacturing in Canada, and at the same time consumers of the United States would get the benefit of cheaper paper than they are now getting. The United States publishers could then have no grievance against the paper manufacturers of their own country, nor would the paper manufacturing interests of the United States be likely to suffer on the whole. The cheaper pulpwood and pulp which they could then avail themselves of would simply mean a greater concentration of paper manufacturing interests in the Eastern and Northern States, where the condition of production would be most favorable. The claims of Nature are so strong in this particular that even under present tariff restrictions the United States now derives one-third of its raw material for paper manufacturing from Canada. The total consumption of pulpwood in the United States is about 2,200,000 cords. Of this, 1,600,000 cords are spruce; about 400,000 cords hemlock, leaving, say, 200,000 cords for other woods, such as poplar, pine, etc. In pulpwood alone the United States gets from Canada annually about 500,000 cords. We are aware that this is much above the recorded imports of the United States from Canada, but we are convinced from information supplied by those in closest touch with the trade, that the records of exports from this country,

(especially from the province of Quebec), are very loosely kept, and that much leaves the country every year under other classifications than that of pulpwood. One company alone, in the Eastern States, gets 200,000 cords annually, another gets 120,000 cords, while minor concerns receive quantities from 5,000 to 50,000 cords per year. One authority states that 100,000 cords of spruce go out of the province of Quebec annually by water and rail unrecorded under any head. Allowing 1⅛-cord for a ton of ground wood, and two cords per ton of sulphite, and combining the shipments of pulp with those of pulpwood, we have as stated, at least one-third of the raw materials for pulp and paper manufacturing in the United States derived from Canada.

From a selfish point of view, and looking at the matter with ideas similar to those that prevail in the United States, an immense prospect could be opened up to Canadian manufacturing if all these materials were worked up in Canada. There are now 842 paper mills in the United States, and it might be an interesting problem for those responsible for the present pulpwood policy of Canada to calculate what amount of money in wages and manufacturers' profit would be distributed yearly in this country if that third of the United States supply were manufactured north of the boundary line.

As matters stand, Canadian public men who are called on to deal with our forest assets, including pulpwood, have a choice between the policy of seeking an understanding with the corresponding interests in the United States, or otherwise looking for the future to the British colonies who are now giving us a preferential tariff, to Great Britain, whose trade is free, and lastly, to some extent to foreign countries, where Canada will meet the competition of the United States on equal terms. In any contingency, Canada has nothing to fear for the future, because it possesses enormous undeveloped water-powers, exceeding those of any country in the world; its possesses also the most extensive areas in the world of pulpwood forests. It is true that some of our politicians in high authority are legislating for the waste and destruction of these forests, but abler and wiser men will be placed in power in time to undo the wrong which is now being wreaked upon the most valuable of all our national assets.

We do not think, however, that Canadians, as a rule, are disposed to make undue demands based on these possessions. We only ask for a fair field and a reasonable exchange of favors from our neighbors. It is now being admitted that many of the smaller U.S. mills are short both of marketable pulp and power to run pulp mills, and to enable such mills to exist, it would seem to be a rational domestic policy for the United States to admit Canadian pulp free of duty. This would give the small mill a fighting chance beside the few big concerns that own large limits and have plenty of power for pulp grinding, and it might then appear to Canadians that their neighbors were willing to share to some extent the benefits of an industry, whose prime raw materials are so largely within the control of the Dominion.

POLITICS IN PULPWOOD.

In June, 1902, the Quebec Government appointed a commission to report upon colonization and the development of the woods and forests of the province.

One of the commissioners died, another resigned, and the work was left to the remaining commissioner, Hon. Geo. W. Stephens, K.C., of Montreal, who at great pains, collected information and made his report, the conclusions of which were reprinted in our issue of December last. We were struck by the comprehensive character of the report, and the sensible counsel embodied in most of Mr. Stephens' conclusions, and the sequel to the report, as revealed in the Quebec Legislature during the past month, seems all the more peculiar. It appears that while Mr. Stephens went on with his investigations and report, supposing his commission was in force, a new commission was appointed by order-in-council, under the same act, and proceeded to take evidence. Mr. Stephens in due course, presented his report, and the other commissioners made theirs. The latter was issued as an official publication, but the Government declined to have Mr. Stephens' report laid on the table of the House the other day on the ground that it was not an official document, he having resigned. It transpires, however, that Mr. Stephens did not resign till after he had concluded his work and sent in his report. His reason for sending a formal resignation then was that he was leaving the country. The inexplicable features of this business are that the rejected report contains no political bias, but simply makes recommendations to remedy evils which had existed alike under both governments; that Premier Parent himself made large use of the report in a speech at the last session of the Legislature, and that the second commission made use of the set of questions drawn up by Mr. Stephens, and further, that the recommendations of the second commission were nearly all the same in substance as those of Mr. Stephens. The main point in which they differ is that the second commission recommends the Dominion Government to impose an export duty on pulpwood, and recommends the Provincial or Dominion Government—they do not say which—to pay a bounty on paper manufactured in the country and shipped abroad. Whatever may be said, by the way, of the former recommendation, the latter, as applied to the paper industry, is vicious in principle, and can only have the same effect as the bounties on sugar bestowed by European Governments—that of raising the price of the bonused products to home consumers without benefiting the home manufacturer, except at the expense of other home industries, yet making it almost impossible to restore the bounty fed industry afterwards to a natural basis, as the European beet root sugar nations have learned to their regret. The report of the second commission, however, is very instructive, and much valuable information has been gathered, and as it has exposed the same evils in the management of the Crown lands and forests as Mr. Stephens did in his report, the course of the Government, in refusing to give the province the benefit of both reports, will be remembered to its discredit. No man in the province has a higher conception of public duty or a more intelligent grasp of affairs, and perhaps few have made greater personal sacrifices in the public interests than Mr. Stephens, and this slight put upon him seems purposeless in itself, and manifestly against the interests of the people, who wish to have all the light that can be thrown upon a question transcending in importance all other matters affecting the material interests of the province. Both reports

condemn the frauds perpetrated by timber limit speculators, through the officials of the Government. On the surface there appears no reason why the people should not have the benefit of both reports. Perhaps a reason will appear later.

Pulp & Paper Currency

After being emptied of their sugar at Greenock refineries, all the Java baskets are sent to the paper mills, where they are manufactured into paper.

Experiments in paper-pulp making by the Agricultural Department at Washington will be watched with interest in Canada. It is believed that methods will be devised for utilizing the fibre of many trees and shrubs other than spruce and poplar, which at present are the principal sources of pulp.

The Quebec Chronicle denounces in strong terms a private bill, now before the Quebec Legislature, entitled: "An Act respecting the Chicoutimi Pulp Company," which it says seeks, through the intervention of Parliament, to anticipate the judicial decision of a case which is at present before the courts of law. The Montreal Witness echoes the opinion.

The monthly report of the Yokohama Chamber of Commerce comes to hand done up in a wrapper of Japanese paper which at once attracts attention. It is what might be called a Japanese manila, thin, and almost as tough as cloth. It is apparently made from the fibre described in last issue, and is admirably adapted for standing the rough handling which newspapers get in the mails. The nearest approach to it in European product is the paper that comes to hand as wrappings of German newspapers.

According to reports laid before the chemical pulp section of the American Pulp and Paper Association, there were in 1903, 86 chemical fibre mills, as against 79 in 1902, the total production in 1903 being 3,200 tons per day, of which 600 tons were bleached. In 1902 the total production of this class of pulp was 2,350 tons of unbleached and 550 tons bleached. The same reports gave the production of Canada as 450 tons per day, in 1903, of which all was unbleached. This was slightly below the estimated products of Canadian sulphite fibre in 1902. The United States exports of chemical pulp, which is chiefly soda fibre made from poplar, were 15,000 tons in 1903 valued at $79,000, being a slight reduction on 1902.

With regard to the New Zealand preferential tariff, as it affects the paper trade, it will be interesting to know the present scope of trade in this line. The paper bag branch is evenly divided between the United States and Great Britain—about £2,350 each. Of wall papers, the United States shipped £5,000, and of wrapping papers, £800. The printing paper imported by New Zealand amounts to about £110,000, of which the United States supplies £45,000, and Canada, £2,000. A study of the situation shows that relatively Canada has much more to gain by the preferential tariff than Great Britain. This gain will, however, be at the expense of the United States, Germany, and other countries which do a large New Zealand trade, rather than of the Mother Country.

The labor problem in the bookbinding trade, especially in Toronto, has been a very serious one for the past two or three years. While higher wages have been offered to girls in other trades, such as the mantle, whitewear, and men's

clothing trade, no one can blame girls for deserting the bindery and improving their condition; but the scarcity of bindery hands, and the steady increase of wages, has rather turned the heads of many girls, and the consequence has been that whole binderies are ready to strike on any trivial matter, while girls take holidays at will and often without much consideration for the exigencies of the work. Owing to these conditions, the Barber & Ellis Co. have decided, since the fire in Toronto, to remove their envelope and paper box factory to Brantford, where female labor is more plentiful, owing to the large proportion of male labor employed in the machine shops and foundries.

It is not surprising to learn that the British preferential tariff has developed the same problem in the paper trades as has arisen in the textile trades. German hosiery and woolen goods, French and Swiss silks and laces are shipped over to London and other English centres and there put through a so-called finishing process and reshipped to Canada as British goods, after passing through third or fourth hands to enable the shipper to escape the penalties of making a false declaration. So in the paper trades we find German manufacturers imitating British water-marks and other indications of British "origin" of goods, and these falsely marked goods are palmed off on not only British consumers, but are re-exported to Canada under the reduced preferential tariff. Now that the surtax of 10 per cent. over the general Canadian tariff is imposed on German goods, the temptation to evade the tariff with the help of agents in England is doubly strong. A good deal of indignation has been expressed by British manufacturers affected, and there is talk of taking "drastic measures." One correspondent says: "The guilty ones were presumed to be wholesale stationers, but a paper maker the other day referred to a well known English news mill, and stated that owing to its inability to meet the demand of home and colonial consumers, the mill found it necessary to import a large quantity of the foreign product. The paper in question, he said, was brought to the mill, re-reeled and then reshipped." Something devolves upon the Canadian Government in this matter, but we have seen no effective measures devised to meet the case either in the textile or the paper trades.

The wood pulp situation in France is interesting. Between the effects of the Russo-Japanese war, and the constantly increasing consumption of news by the big dailies of Europe and the United States, from which supplies of pulp have been largely drawn, the French paper makers are faced with the necessity of increasing the price of paper to correspond with the increased cost of pulp. A special meeting of the French Paper Makers' Association was held in Paris, last month to consider the situation, and it was decided that each member of the Association should issue a circular to his customers informing them that a rise would shortly have to be made. The amount of increase was not decided on, but it is thought that 15 per cent. would be the minimum. Similar action has been taken by the paper dealers' associations of France. Outhenin Chalandre, the president of the Paper Makers' Association, in the course of a statement of the case, said that prices of pulp in France had gone up 20 per cent. within the past year, and if the step which the

Scandinavian Association of Wood Pulp Manufacturers threaten—that is the systematic reduction of their output—is actually carried out, the situation will be acute. This turn of events ought to be closely watched by Canadian pulp manufacturers. There is always a demand for wood pulp in France, as the home manufacture is small, owing to the limited area of suitable forests. The new direct line of steamers from Canada to France should afford cheap freight, and the rise in pulp should give an opening for a general introduction of the Canadian article into a market which has large possibilities for pulp made in Quebec and the Maritime Provinces. We may mention that the customs duty on mechanical pulp entering France is 29 cents per 100 kilos., and on sulphite pulp, 48¼ cents per 100 kilos. A kilogram equals 2 1-5 lbs. It is to be hoped that in any future revision of the commercial treaty with France, pulp and paper may be put upon the favored list.

Forestry and Pulpwood

A Russian firm, writing to the Pulp and Paper Magazine, states that there may be a market for Canadian wood pulp, and cheap printing paper in that country. Any of our Canadian manufacturers desiring to look into the possibilities of this trade can ascertain the name of the firm by writing to us.

Serious complaints are made, both in Ontario and Quebec, as to the operations of timber grabbers, who, under the pretence of being actual settlers, take up lands which they strip of the timber, other than pine, and then abandon them. In Ontario, at least, a more rigid system of inspection is being inaugurated to put a stop, as far as possible, to this practice.

Mr. Tindall, secretary of the Lumbermen's Association of Ontario, in his report, which was presented at the annual meeting, stated that the increased cost of log production the past winter would require fully a 10 per cent. increase in the price of lumber to place the lumbermen in the same position as the previous year. The cost of getting out pulpwood was no doubt increased in the same proportion.

The following are the officers of the Quebec Limit Holders' Association, elected at their annual meeting at Quebec, April 29th: President, Hon. Senator Edwards; vice-presidents,, F. P. Buck, Royal Paper Mills Company, Sherbrooke, and Wm. Price, of Price Bros. & Co., Quebec. Executive committee: Rodolphe Tourville, Montreal; Alexander McLaurin, Montreal; Wm. Power, M.P., Quebec; H. M. Durant, St. Gabriel de Brandon; Archibald Fraser, Cabano; J. W. Brankley, Agnes; F. F. Farmer, Three Rivers; E. A. Dubuc, Chicoutimi Pulp Company, Chicoutimi; John Champoux, Disraeli; H. K. Egan, Ottawa. P. G. Owen was re-elected secretary.

Personal

It is announced that Thomas Allison has been apointed manager of the Spanish River Pulp and Paper Co., at Webbwood.

F. W. Johnson, formerly traveller for Northwestern Ontario for the Lincoln Paper Co., is now their representative in Toronto.

A. B. Craig, president, and C. W. Rantoul, manager, of the Imperial Paper Mills, of Sturgeon Falls, paid a short visit to Toronto this month. Mr. Craig will return to the Old Country shortly.

Charles Todd Moffett, of Watertown, N.Y., is spending this month at the Frontenac Hotel, Quebec. Mr. Moffett is in the market for pulpwood, and will be pleased to meet or correspond with interested parties.

John R. Barber, M.P.P., of Barber Bros., paper manufacturers, Georgetown, and of the Barber & Ellis Co., Toronto,

was largely the means of saving the Queen's Hotel, at which he was a guest, the night of the great fire in Toronto. When Warwick Bros. & Rutter's warehouse was on fire, next door, and it seemed almost inevitable that the Queen's would go, Mr. Barber organized a brigade of the guests and others, had the baths filled with water and soaked blankets which were hung outside the windows and kept constantly wet, thus preventing the glass from breaking with the heat, and the woodwork catching fire. Mr. Barber's efforts were the means on that fateful night of saving much valuable property.

LITERARY NOTES.

We have the first issue of the British Columbia Lumberman, published monthly at Vancouver, B.C. It contains much information of value to those connected with the lumber interests of the Pacific province, and the news department appears to be specially well edited.

The N.B. Tourist Association, of which T. H. Bullock is president, and Mrs. R. E. Olive, secretary, St. John, N.B., has issued a very attractive booklet describing and illustrating St. John and its environs. It has a map of the Maritime Provinces, and a summary of the fishing and game laws, with information on the haunts of game and fish and how to reach them.

Marchant, Singer & Co., 47 Mary Ave., London, S.E., England, have issued the 1904 edition of the "Directory of Paper Makers" of the United Kingdom, which is mailed to subscribers in Canada at 1s. 6d. This handy reference book gives lists of all the paper mills of Great Britain with the products of each mill; also a list of trade marks and water marks, lists of selling agents of the mills, lists of wholesale stationers, with a classified list of the announcements of the leading makers of paper machinery and mill supplies.

We have received from the Bureau of Provincial Information for British Columbia, Bulletin No. 14, The Markets on the Pacific for British Columbia Wood, Pulp and Paper, and Bulletin No. 15, The Timber Industry of British Columbia. The latter is handsomely illustrated, and besides information relating to Forestry and the Timber Industry, deals with the manufacture of paper and pulp in a general way; the former tells of the markets to which British Columbia pulp and paper is or may be sent, with information as to customs duties, prices, etc., etc.

THE UNITED STATES NEWS PRINT COMBINE.

Reference was made in the last issue of the Paper and Pulp Magazine to the famine in news print in the United States, and to the fact that Congress declined to take action for an investigation through the Department of Commerce and Labor. Since then, Conde Hamlin, of the St. Paul Pioneer Press; Don C. Seitz, of the New York World, and John Norris, of the Philadelphia Ledger, and the New York Times, representing the American Newspaper Publishers' Association, called on the Attorney-General and laid before him a complaint against the so-called paper manufacturers' trust, alleging violations of the Sherman Anti-Trust Act. The Attorney-General explained what could and what could not be accomplished under the Sherman Act and particularly the distinction the courts have drawn between combinations affecting production and those affecting interstate commerce directly. Yet, upon a showing of evidence, which seemed to indicate that a combination exists in the paper business, whereby different paper manufacturers have agreed to reduce the supply of paper and to divide among themselves the territory of its consumption, the Attorney-General stated that he would have an investigation made, and if it were found that this feature of the charges could be sustained, he would institute appropriate proceedings to stop it.

U.S. PAPER STOCK AND PULP IMPORTS.

The United States imports of paper stock from Canada for the nine months ending March were in value, as follows, in the past three years: 1902, $84,371; 1903, $72,596 and 1904, $105,151.

For the same period, the total United States imports of wood pulp were as follows:

	TONS.		
	1902.	1903.	1904.
Germany	3,153	10,212	7,074
Other Europe....	7,334	41,494	24,281
Br. N. America.	36,523	61,383	82,185
Totals	47,010	86,089	113,540

	VALUE.		
	1902.	1903.	1904.
Germany ..	$132,159	$458,847	$306,455
Other Europe	348,670	618,153	968,767
British N. America ..	965,446	1,426,453	1,476,041
Totals ..	$1,446,275	$2,503,452	$2,751,263

—Two of the oldest and largest houses in the French-Canadian book trade—Cadieux & Derome, and Beauchemin & Co.—have been amalgamated under the name of the Beauchemin Book Co. Both these firms have published in years past a good deal of Canadian literature in the shape of books and periodicals, and it is gratifying to learn that one object of the amalgamation is to supply in larger quantity good sound literature to French-Canadian readers.

The old lithographing firm of Rolph, Smith & Co., who were burnt out in the great Toronto fire, will be amalgamated with the Clark Lithographing Co., of Toronto. A new company is now being formed, and large lithographing works are being erected on the old Upper Canada College grounds, bounded by King, Simcoe and Adelaide streets. The new works will probably be further extended soon, but the present buildings will be ready for occupation in July. The style of the new company will be Rolph & Clark, Limited, and the principal members will be A. Rolph, Joseph T. Frank, and Frank Rolph, Jr., of the firm of Rolph, Smith & Co., and Thos. J. Clark, of the Clark Lithographing Co. The company has purchased the interests of David Smith, who retires from the business. Until the new building is ready, the business will be carried on at 26 Lombard street.

—At the annual meeting of the Amalgamated Society of Paper Makers, held recently in London, the delegates unanimously supported the proposal to give answers to a list of questions submitted by Mr. Chamberlain's Tariff Commission. The secretary, Wm. Dyson, was requested to give the necessary information, which will go to show the detrimental effect the free importation of paper has on the employment of British labor. The secretary pointed out at the meeting that, roughly, 33,000 tons of foreign paper were imported into the United Kingdom each month, and computing the labor cost of a ton of paper at £2 5s., it meant that £75,000 was lost to the pockets of British workmen. An invitation was received by the society to send a delegate to the proposed International Congress of Paper Makers, to be held shortly in Belgium, but, recognizing the difference of the prevailing conditions on the Continent and Great Britain, the delegates, while of opinion that it was desirable that the status of foreign workers should be improved, felt that no benefit would result in sending an English representative, and therefore the invitation was declined.

—The bookbinders of Montreal are on strike.

The liquidators of the Maritime Sulphite Fibre Company, of Chatham, N.B., give notice of a final dividend to the creditors of 1½ per cent., payable on May 17th, at the office of R. A. Lawlor. Chatham, N.B.

MECHANICAL WOOD PULP.*

By Stanislas Gagne, B.A., Sc.

(Continued from last issue.)

SCREENING.

Where the pulp falls from the grinders enough water is added to it to render it fluid and on its way to the reservoirs it passes over perforated plates which retain the chips and splinters that have passed through unground. It is again diluted here and is pumped up into the individual screens or into a long distributing trough above the screens. In Canada, only two types of screens are used, viz., the rotary or centrifugal and the vibrating, the former type being the newest and not so commonly used as the latter. Although they work differently, as will be seen later, their object is the same, viz., to separate the well ground from the badly ground pulp. Some mills separate their pulp into several classes, according to degree of fineness, but the majority make use of only one size of screen holes or slits, all the material not passing through these being entirely rejected; but it is a self-evident matter that it would be economical to use all the product of the grinders if a market could be found for it. We will confine our remarks to but one screening or separation and describe some of the methods by which it is accomplished.

VIBRATING SCREENS.

Figure 24 is a view of a vibrating screen. It consists of, first, a wooden box at the bottom of which are the screen plates; below these plates is a diaphragm which is made to vibrate up and down by means of a shoe and cam. The pulp held in suspension in water is admitted over these plates by pipe and tap from the long trough containing the stock, and a downward movement of the diaphragm draws or sucks the material through the slits in the plates; the next upward movement blows the slivers and other coarse material out of these slits; the two actions constituting a vibration. Figure 26 represents the diaphragm and connections. The box receiving the stock over the plates is usually made of wood and so hinged that it may be lifted over the rest of the machine. The frame containing the plates is also hinged and permits of being raised for examination and cleaning. The screen plates are made of brass about 12 by 40 inches in size, and 3/8 to 1-3-inch in thickness, with slits or holes 2 to 3 inches long and from .008 to .020 inch wide, according to the nature of the stock to be screened and the fineness of the product required. The connection of the diaphragm to the sides of the box is usually made by India rubber of suitable elasticity and strength. The knockers or shoes transmitting the vibrations from the cam are usually of wood and are protected by cast iron and bolted casings to prevent them from splitting. The cam is rigidly fixed to the shaft and is made of steel; it is so arranged as to give 1, 2, 3 or 4 throws each revolution, according to the speed of the shaft and to the rate desired by the manufacturer. These cams are so arranged on the shaft that the strain on the driving belt is uniform throughout each revolution. One or two springs are placed around or near the shoe so that it is always kept in contact with the cam, shock and noise being thus avoided. The capacity of such a screen containing 10 to 12 plates on four cams varies with the speed, the size of the slits and the quality of the stock. With No. 8 to 10 slits, ordinary well ground pulp and at a rate of 400 to 600 vibrations per minute, it is from two to three tons per day; and with No. 10 to 16 slits from four to six tons. The box over the plates is sometimes divided up, so that by the time when the stock, coming from A (Fig 27) and passing through B and C, arrives at D, all the desirable material has passed through, the coarse only being left over. This waste is put into a box or receiver of any kind and dumped into the river or elsewhere, according to the location of the mill. The screens are often arranged

*The above paper won the first prize given by the publishers of the Pulp and Paper Magazine for the best student's paper presented to the Canadian Society of Civil Engineers for 1903, the judges being members of the Society.

in a row, as was seen in Figure 10, above the wet machines and either separate or forming a continuous trough. They are provided with an additional box to receive the screened stock, which may also be made continuous throughout the whole row. Either this last method is adopted or a long second trough is added, into which all the screens discharge, and from which all the wet machines take their supply. This permits the cutting off of any screen for cleaning or repairs without stopping the wet machine connected with it. When the plates have been used for some time, and especially when resinous balsam is used, they become clogged and must be cleaned. This is usually done with a jet of steam, or, if much gummed, with a piece of felt dipped in coal oil.

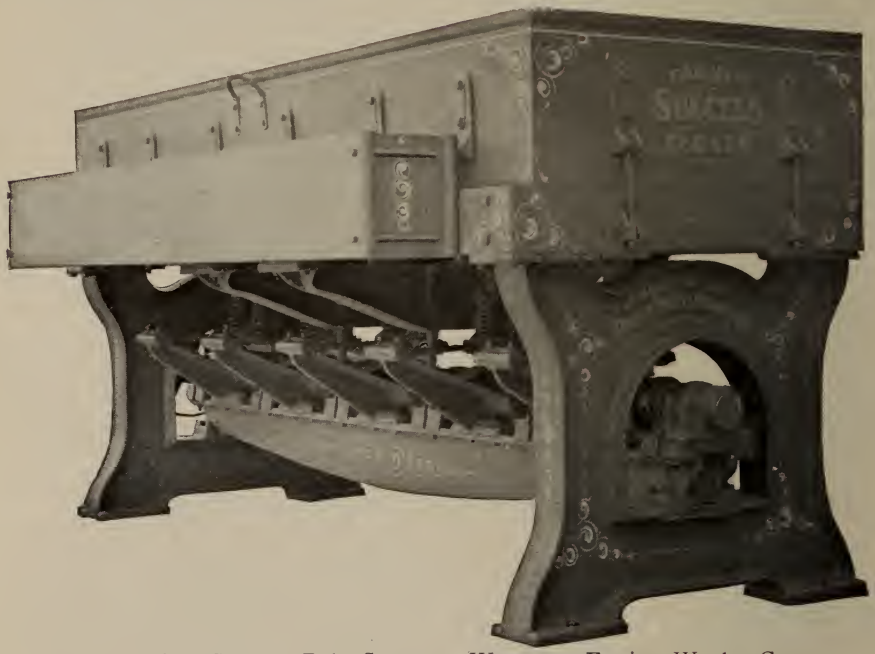


Fig. 24—New Success Pulp Screen. —Waterous Engine Works Co.

CENTRIFUGAL SCREENS.

Figure 28 is a cut of the Baker & Shevlin centrifugal screen, and Figure 35 illustrates the principle on which it works. As seen in this last figure, it consists of an outer cylinder or casing A, of a cylindrical rolled brass plate B, perforated with small round holes, of vanes V, of a cylinder C, perforated at different plates with large holes, and of a tube and vertical shaft S on which the vanes are fastened. The pulp is admitted from pipe F, to which it has been pumped, and falls inside of cylinder C; the vanes revolving at high speed, act as a centrifugal pump (thence its name), causing the pulp to flow radially; it then passes through the large holes in C, which serve to distribute it evenly and is forced against the screen cylinder B, where the desirable part, i.e., that of a certain size and below it, passes through and falls in H, and the undesirable part, i.e., the coarse chips and splinters, remains inside and falls in K; the good pulp passes from H into the distributing trough above the wet machines, while the remainder passes from K into a wasting tank or a dumping place. The holes in B are round, and therefore quite different from those in the plates of the vibrating type, and, moreover, in this case the fibres must pass through them more or less end first. However, the screening action seems to depend, to a certain extent, on a coating as thick as the distance from the end

of the vanes to the cylinder B will permit, which consists of coarse material collecting against the inside of the plate B, through which coating the pulp must pass before reaching the holes in the plate. Therefore the screening action of this type is more obscure, i.e., not so well defined nor so easily conceived as in the case of the vibrating type, and hence can be judged by results only. Some claim that one of these centrifugal screens will do the work of as many as ten of the vibrating type, that it requires much less power and largely reduces the waste. On the contrary, others would not use them because, as they say, they injure the felting power of the pulp, which they render mealy or short by breaking the long fibres in roughly forcing them through a mass of chips and splinters. This is but one of the many differences of opinion between manufacturers in the pulp industry.

THE MOORE ROTARY SCREEN.

This screen is gaining favor with many Canadian manufacturers and deserves mention here. Its general appearance is shown by Figure 30, and Figure 31 represents a vertical section through it. The whole screen stands about 9½ ft. high and, with the exception of the wood step, which steadies the bottom end of the revolving plates and supports part of

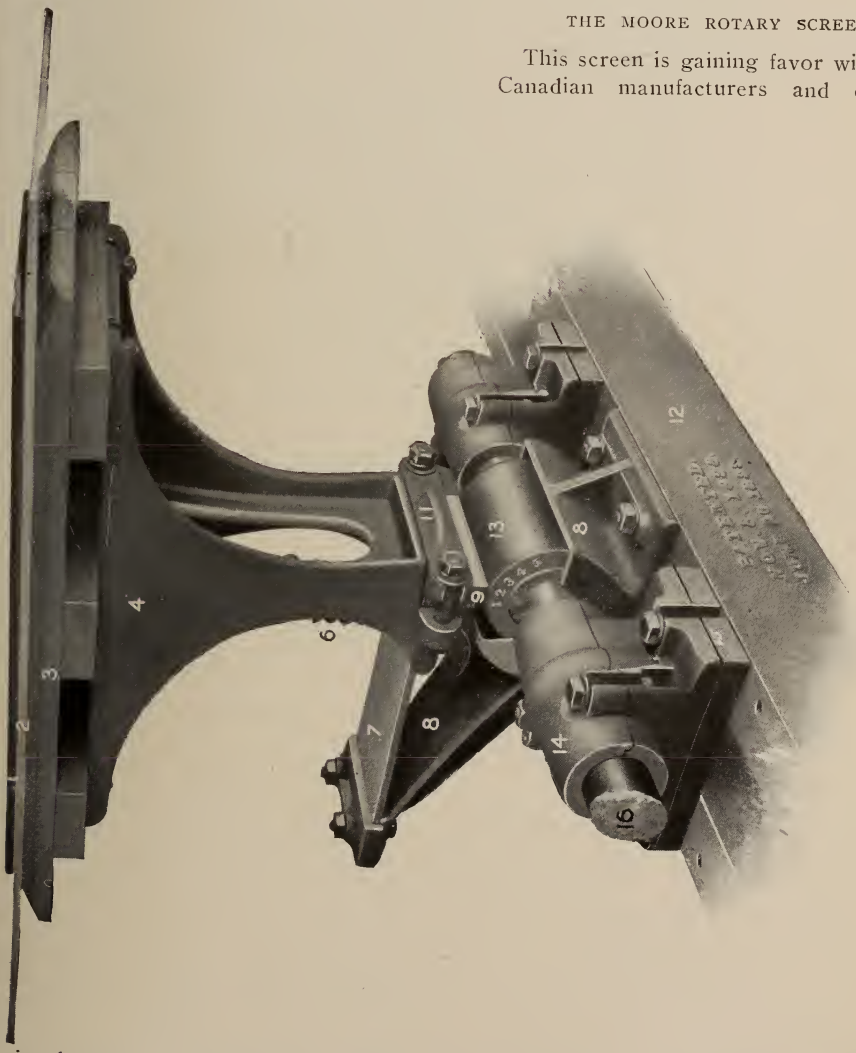


Fig. 26—Success Screen Diaphragm and Connections.

its weight, is made entirely of metal. The screen plates are of brass, made in sections, perforated with holes 85-1000 of an inch in diameter (smaller or larger at the option of the purchaser), and are secured to the steel frame by brass screws. The stock enters the screen at the bottom by means of a 6-in. pipe rising straight up at the centre of the screen, and is discharged against the screen plates by means of four or more smaller pipes which radiate from the

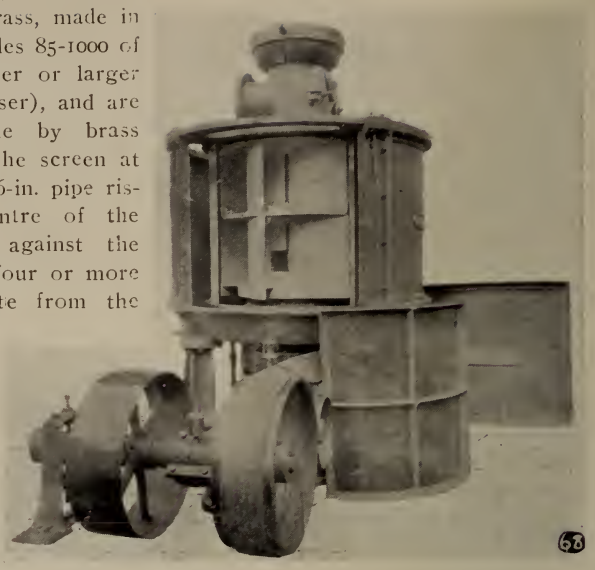
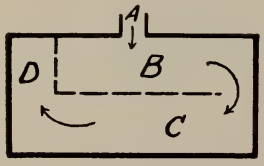


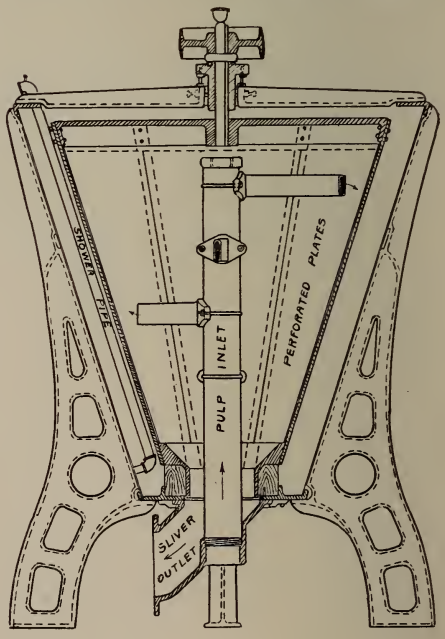
Fig. 28—Centrifugal Screen.

centre pipe in different directions.. Unlike the Baker & Shevlin screen, the screen plates, and not the centre pipes and vanes, revolve in this machine and usually at the rate of 60 to 70 R.P.M. This produces a centrifugal force, which, together with the force with which the stock is discharged through the radial pipes, carries the desirable pulp through the holes, while the coarser material remains inside and gradually falls down to



Division of Screen Box
Fig. 27.

the sliver outlet. The outside of the plates is kept constantly clean by means of a brass shower pipe: a larger capacity being then afforded. The screened stock comes out through the pipe, shown at the side in Figure 31, and the slivers by the elbow at the bottom. The plates are driven by a pulley on the top of the machine and are carried by a roller bearing of hardened tool steel which contains 14 one-inch steel balls. Like the Baker &



The Moore Rotary Screen
Fig. 31—Section of Moore Rotary Screen.

Fig.30—Moore Rotary Screen of Jenckes Machine Co.

Shevlin screen, the screening is done through round holes, and most of wha has been said regarding it may apply to the Moore screen. The manufacturers claim an output of five tons of pulp per 24 hours with an expenditure of three horse-power. Most of the screens have a capacity of 20 to 25 tons per 24 hours.

(To be continued.)

Agreement has been heard and judgment reserved by the Court of Appeal in the appeal of the Toronto Paper Manufacturing Co. from the judgment of Chancellor Boyd, awarding $8.000 damages to one Glasgow for injuries received in the company's paper mill, at Cornwall.

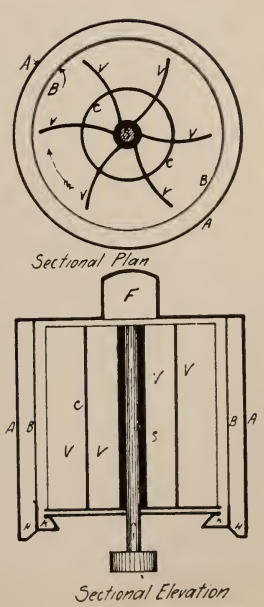


Fig. 35.

WINKLER'S PAPER TESTING OFFICE.

The eighteenth annual report has recently been issued relating to the work of Winkler's Paper Testing Office, Leipsic. It is stated there is a good demand for its services on the part of both paper makers and paper users, and considerable support is also given by the German publishing trade. Attention is not only given to paper, but also to raw materials, chemicals, colors, etc.

The office has become an authority for settling questions of moisture in pulps, in connection with which special facilities have been introduced. There were 775 moisture tests conducted during the year, and other tests brought the total up to 1,560.

There were 380 cases which called for microscopic determination of the composition of fibres. It appears that 125 papers were examined for toughness; 189 as to size resistance; 65 as to discoloring; 108 as to exemption from acids, and 65 as to transparency. Enquiries were frequently received by the office as to the use of certain papers for specific purposes. The work of the office shows that rejections in many cases were not entirely unjustifiable, although in many cases a closer examination proved that the objections raised could not be maintained.

As in former years, paper experts studied and acquired practice as a preparation for responsible posts which they had in view. Among those receiving training at the office was an Italian gentleman, who joined his father's firm of paper makers, also another gentleman who was appointed manager of a chemical wood pulp factory and paper mill. Another student acquired a thorough knowledge of paper before joining a fancy and surface paper factory.

The value of the office is also recognized by the printing trade, and the Leipsic printers arranged for a series of lectures on paper testing. A highly glazed surface of printing paper is fast losing its popularity, a substitute being required giving equally good results. The matter is engaging the attention of the Winkler office, and the results will be published in due course.

Reference is made in the report to a method for preserving manuscripts and parchments invented by Dr. Schill, and this process is in use in some libraries. The cause of the premature destruction of papers depends partly upon the fibres from which they are made, and also on the influence of acids, sizes, etc. Dampness, dry heat, and fungus are also great enemies in regard to the preservation of documents, etc. The method of Dr. Schill consists in coating the documents with a special substance which gives a protection to the paper against any outward influence. The experiments made by the office have proved satisfactory.

The transparency of paper has also been given special attention, the opaqueness being brought under six classes, from O, which is quite transparent, to V, which is as opaque as can be reasonably expected.

Among enquiries was one as to the cause of spots appearing on wall paper, after it had been pasted on the wall. It was proved in some instances to be due to the acid in glue, but in others it was the raw paper which, after a certain time of exposure to air and sun, discolored and became dirty. Experiments were also conducted with the view of obtaining suitable methods of sizing. The cause of breakages in parchment papers was found to consist in free acid, and in other cases chloride of zinc was used in the manufacture of the paper.

Concerning moisture in china clay, the report states that in Great Britain 5 to 6 per cent. moisture is general; in France, 10 per cent.; in Austria-Hungary, 8 per cent., but no fixed rule seems to have been made in Germany.

Concerning the loss of fibre in the process of paper making, some curious results are mentioned, in one case in a mechanical wood pulp paper there was a loss of 45 per cent. in some unexplained manner, and in another case, that of sulphite cigarette paper, out of 60 per cent.

sulphite, blended with 40 per cent. rag, only 10 per cent. sulphite could be found, so that the remainder must in the process of manufacture have become dissolved and gone out with the surplus water. A question dealing with calender rollers, as to the surface becoming brittle and peeling off and showing holes, it appears that the trouble was due to acid combined with high pressure and heat injuring the surface of the rollers. —Paper Trade Journal.

NORTH-EASTERN CANADA.

BY HENRY HOLGATE, C.E., MONTREAL.

(Concluded from April issue.)

The surveys and explorations made under the direction of the Crown Lands Department of Quebec contain detailed information of practical value, and embrace good reports relating to timber, minerals and rivers of the country. Conditions do not point to the probability of this area becoming an agricultural country, but this is more by comparison than otherwise after all, for we have already such enormous areas eminently suited for the raising of staple crops, that naturally they will be the first to be developed. This, however, does not mean that north-eastern Canada cannot produce hardy crops, which has already been proved. The area of the territory north and east of a line drawn from the mouth of the Saguenay river to James' Bay is about 589,000 square miles, and of which area 234,000 square miles is included in the province of Quebec. The area comprising the southern watershed is about 180,000 square miles, the waters from this area discharging into the River and Gulf of St. Lawrence.

This immense watershed supplies numerous rivers affording in their course southward a great many water-powers varying in capacity from 1,000-h.p. to more than 200,000-h.p. at one development site. The timber yielding area is practically confined to this southern watershed, and although it is but a small proportion of the total area of the whole territory, it is nearly four times larger than the State of New York. The timber consists principally of several varieties of spruce, balsam, and white

birch, tamarac being found in the eastern portion. The distribution of the

streams and rivers in the southern watershed is such as to render all of the timber accessible, so that when the market demands arise, the whole of the timber will be available. The existence of the water-powers is a feature tending to encourage development in preference to localities not so favorably situated, especially will this be true of such industries as the manufacture of wood pulp and its products. Several companies have already appreciated the conditions here afforded, and have begun the development on more or less large scale, but the field is so great that development may be said hardly to have begun. The whole country is well supplied with minerals, but wants further explorations to make more fully known its resources. Mr. Low states that the occurrence of gold, copper, nickel and pyrites render the tracing of these areas of great importance, and we can rely upon the Geological Survey of Canada following this up. The known deposits of iron ore are very large, and will be of great value, depending on transportation facilities, and the advancement of the use of electricity in smelting. Owing to the tremendous water-powers available for the production of electricity, this locality offers unmatched facilities for industries of this nature as soon as the commercial features of electric smelting shall have been solved. The deposits of magnetic iron sand along the coast have for years attracted attention, but have not been used to commercial advantage yet, and no doubt await more favorable means of reduction and treatment on the spot, for, owing to the difficulty of gathering and transporting, their great value will lie in local treatment.

At present there is no railway east of the Saguenay river, and internal development cannot progress without such facilities for transportation, and until a railway is built the products must find their way to the coast by the numerous rivers, thus limiting the usefulness of the products of the interior practically to those of the forest. As, however, many of the large deposits of iron ore are close to the coast, and as the greatest water-powers are there also, it becomes more a question of transportation by water that concerns the immediate questions of development.

For navigation, the coast is provided with numerous natural harbors, and many bays that can be rendered safe for shipping purposes by the construction of protection works more or less extensive. One of the best natural harbors in the world exists on this coast, that of the Bay of Seven Islands, for which nature has done her best in producing something better than anything else in America. But when nature turned over this harbor to us, she "kept a string on it," for she closes it up nearly every year with ice. I say nearly every year for there have been years when but little ice has been seen in the harbor, and from what can be ascertained from personal observation and enquiry, navigation could be maintained all the year round with an ice-breaking ship of very modest proportions. The question of navigation all the year round from and to Seven Islands appears to be one of harbor facilities only, for once outside, there are no obstructions, not even from the ice, at any season of the year, except such as may arise from ice coming through Belle Isle, and this is, of course, common to all navigation in the Gulf, and occurs in the early summer months.

From the facts before us, we must look upon the development of such a harbor as that of Seven Islands as not only a possibility, but a probability. It becomes an objective point farther east than Quebec as an outlet for trans-Atlantic commerce, and in the regular order of progress must sooner or later be reached by a railway from the West.

Geographically considered, Seven Islands occupies a favorable place, its latitude is 50 deg. 13' N. and its longitude 66 deg. 24' W., and is about 200 miles farther south than Liverpool. The following table of distances may serve to illustrate its relative location more

clearly, taking Liverpool as the point of destination:

Sailing Distance from	Miles.
New York	3,105
Boston	2,807
Portland	2,789
Montreal	2,778
St. John	2,700
Quebec	2,633
Halifax	2,450
Seven Islands	2,304

Seven Islands is 800 miles nearer Liverpool than is New York. The objections to the opening up of a new trade route are always strongly urged, and sometimes facts are ignored which tend to strengthen the claims of the new route for recognition, so it is well to state the main facts in its favor and these are, the shortest sailing route across the Atlantic, the coast is accessible all the year, and the harbor itself is magnificent. These are certainly good things to start with. Who will develop this new route?

It must also be borne in mind that having the rail terminal at Seven Islands also shortens the length of rail haul from the West. If a northerly trans-continental rail route to the south be built, and as Canada is now served with a trans-continental rail route to the south, it will be a matter worth careful consideration for any future trans-continental route as to whether Seven Islands should be the terminus. Northeastern Canada has received in the past but scant attention, yet as there are certain elementary conditions which render it valuable as a producer, and as a channel for the products of the West, it must at no distant date receive the attention of the manufacturer, and of those interested in transportation in its larger sense, and this is emphasized by the fact that having Seven Islands as the eastern terminus affords a route very considerably shorter than any existing trans-continental railway. A short study of the accompanying map clearly shows the comparison between the routes.

MACHINE FOR PRESSING WOOD PULP.

Rufus E. Boschert, of Syracuse, N.Y., has taken out a United States patent for a wood pulp press.

Fig. 1 is a side elevation of a machine embodying the invention. Fig. 2 is a plan view of the same. Figs. 3, 4, 5 and 6 are transverse sections on lines X X, Y Y, Z Z, and U U, respectively, in Fig. 1. Fig. 7 is a longitudinal sectional view of one of the cylinders containing the pistons which retract the follower in the press chamber, and Figs. 8 and 9 are enlarged face and top views of the strainer with parts broken away. A and B represent two cylinders of ordinary construction for hydraulic or hydro-static pressure. They are placed axially in line with each other and firmly tied together by means of stout rods or bars *e e*, which serve to hold said cylinders at a uniform distance apart. Between said cylinders and in line therewith is the press chamber C, which is formed with parallel imperforate sides and open ends and has connected to it the pulp induction pipe *g*, which is provided with a suitable valve or cock *h*, for controlling the flow of the pulp from the elevated tank of the pulp mill. In case the pulp to be treated is in a semifluid condition or of such a consistency that it cannot readily flow through the pipe, the chamber C is to be provided with a suitable door or gate through which to introduce said pulp. The press chamber may be of any desired shape and size in cross section uniform throughout its length. It is preferable to form the chamber of cast metal braced by stout ribs *r r*, formed on the exterior of said chamber. The ribs *r r* are formed with saddles *o o*, by which the chamber C is supported on the rods *e e*. The saddles partly embrace the rods, so as to prevent lateral movement of the chamber.

To prevent longitudinal movement of the press chamber C, the rods *e e* have rigidly attached to them collars *f f*, which abut against the sides of two ad-

jacent ribs *r r*. However, other means may be provided for that purpose.

The two cylinders A B are provided, respectively, with plungers or pistons D D′, which project from the cylinders toward the adjacent ends of the press chamber C. Suitable packings *b* are provided to form water tight joints around the pistons in the usual manner. To the piston D is attached a follower *a*, which is shaped to fit closely to the interior of the press chamber, in which it moves longitudinally during the operation of the machine. At the opposite end of the press chamber is an abutting head *a′*, entering the press chamber a short distance and provided with flanges a^2 engaging the end face of the press chamber C, so as to close said end of the chamber during the process of expressing the liquid from the pulp contained in the press chamber. This abutting head is attached to the piston D′, by means of which it is carried to and from the end of the press chamber. The said follower and abutting head are each provided with vertical grooves *i′ i′* in the side facing the chamber C, which grooves communicate

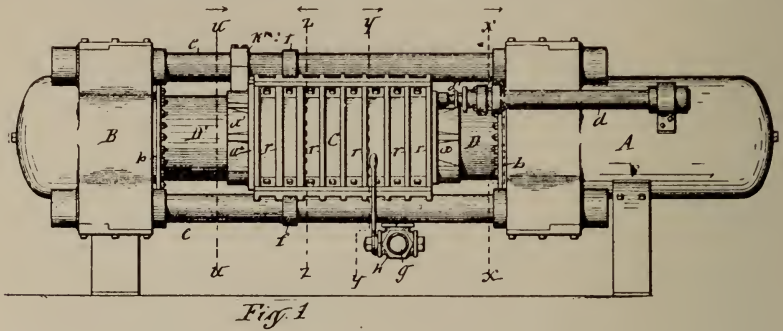


Fig. 1

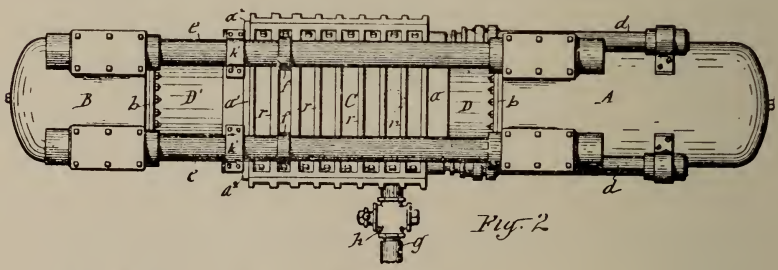


Fig. 2

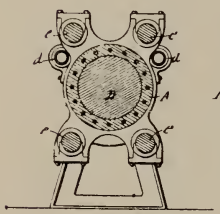


Fig 3

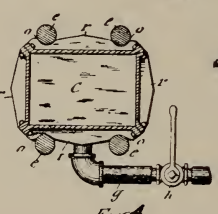


Fig 4

Fig 7

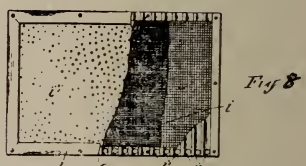


Fig 8

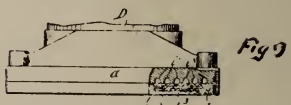


Fig 9

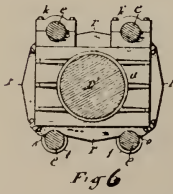


Fig 6

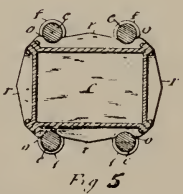


Fig 5

with suitable outlets for the liquid expressed from the pulp in said chamber. Over the said grooved face is placed a suitable strainer *i*, preferably formed of one or more sheets of coarse wire cloth or netting placed adjacent to said grooved face, a finer wire cloth placed upon the coarser, and a still finer wire cloth or finely perforated brass plate i^5 forms the surface which comes in contact with the semi-liquid pulp. The strainers are seated in recesses in the faces of the follower *a* and abutting head *a'* and confined therein by means of frames *j*, placed on the margins of the exteriors of the strainers and suitably attached to the follower and press head. The abutting head *a'* is provided with boxes *k' k'*, riding on the rods *e e*, which are parallel with the side walls of the chamber C, and serve to more positively guide the head *a'* in line with the movement of the follower. *d d* represent supplemental cylinders attached to the main cylinder A, and disposed axially parallel therewith. These supplemental cylinders are also constructed for hydraulic or hydrostatic pressure and have their pistons *d' d'* connected to the follower *a* for the purpose of retracting said follower after the completion of the process of expressing the liquid from the pulp in the press chamber C. The ends of the cylinders *d d* farthest from the press chamber are open to permit free retrograde movement of the pistons *d' d'*. Suitable valves are provided for operating cylinders.

The operation of the press is as follows: Water under pressure having been admitted into the cylinder B' causes the piston D' to force the abutting head *a'* against the end of the press chamber to close said end. The cylinder A at the opposite end of the press chamber having been released from pressure and the cylinders *d' d'* charged with water, pressure causes the follower *a* to be retracted in the press chamber, thus leaving the chamber C in condition for receiving the semifluid pulp to be treated therein. The fluid or semifluid pulp is then introduced into the press chamber, and when this is properly charged the pulp inlet is closed. The water pressure is then admitted into the main cylinder A, the supplemental cylinders *d d* having been relieved from such pressure, while the water pressure is maintained in the cylinder B to keep the press chamber closed. The pressure applied to the piston D of the cylinder A forces the follower *a* inward in the press chamber and compresses the pulp, so as to expel the liquid therefrom and convert it into a comparatively dry sheet or cake. After this is accomplished, the cylinder B is relieved from water pressure, thus allowing the abutting head to yield to the pressure of the pulp and to be forced from the end of the press chamber by a secondary inward pressure applied to the follower, which pushes both the compressed pulp and abutting head *a'* simultaneously from the press chamber. The imperforate walls of the press chamber are essential to my invention, inasmuch as they allow the compressed pulp to freely slide out of the end of the press chamber without tearing or roughening the edges of said pulp. After this has been accomplished the piston D, with the follower *a*, is retracted, leaving the sheet or cake of pulp free to be removed from the machine and the abutting head to be simultaneously reseated on the press chamber by water pressure, as before. The piston D having at the same time been completely retracted in the cylinder A by the pistons of the supplemental cylinders *d d*, leaves the machine in condition to operate on another supply of fluid or semifluid pulp. The inventor does not limit himself to employing hydraulic or hydrostatic power for operating the press, inasmuch as the follower *a* and the abutting head *a'* may be operated by either a screw, levers, cams, or other suitable mechanical power. The salient feature of the operation of the follower *a* and abutting head *a'* in the open ended press chamber is the convenient and expeditious discharge of the pressed pulp therefrom.—Paper Trade Journal.

NEW COMPANIES.

The following new companies have been incorporated in connection with the paper and pulp trade:

The Charlevoix Lumber Company; capital, $20,000; to manufacture pulpwood, pulp, paper and all other articles in wood, etc., etc. E. E. Demers, J. P. Demers, of Aston, Que.; Wilfrid Demers, of St. Sylvere; P. D. Forest, of St. Wenceslas; A. G. Auger, of Quebec.

The well known firm of Warwick Bros. & Rutter, printers and stationers, Toronto, has been converted into a joint stock company, with a capital of $250,000. The provisional directors are: Geo. R. Warwick, A. F. Rutter, C. E. Warwick, E. J. Hathaway, and N. A. Sinclair. The company takes over the business of the old firm of Government printers, and will carry on its contracts.

Lazier Paper Mills; capital, $50,000; Belleville. Stephen A. Lazier, Robert E. Lazier, and Allan E. MacColl, provisional directors.

Thomas Gain, formerly with the Lincoln Paper Mills, Merritton, Ont., is now with Douglas & Ratcliff, Limited, paper dealers, Toronto.

Russell M. Loomis, a son of John R. Loomis, late comptroller of the United Box, Board and Paper Co., of the United States, was drowned last month by the capsizing of his canoe in the St. Maurice river in Quebec.

SAMPLES RECEIVED.

The following sample books of paper have been received at the office of the Paper and Pulp Magazine:

The Rolland Paper Co., Montreal. Crown Linen and Standard Pure Linen, made in Canada. These papers have generally been imported, but the Rolland Co. appears to be able to turn out as good a quality "Made in Canada." At the World's Exposition, at Paris, in 1900, they carried off the only grand prize given for record, ledger and bond papers, and have won numerous gold and other medals at Chicago and other places.

John Dickinson & Co., 78 Fifth Ave., New York. Bangalore book papers. These papers are of excellent quality and reasonable price.

Mittineague Paper Co., Mittineague, Mass. Alexis bond. Also Strathmore parchment. These are beautiful papers.

Canada Paper Co., Montreal and Toronto. Taffeta cover. A strong, bulky, quick-printing paper in six colors.

Ibbotson Brothers, 64 Goswell Road, London, E.C. Imitation leather and other fancy papers.

The Caxton Type Foundry, 124 York St., Toronto, sends us a sample sheet printed with Haddon old style, new book face type. This is a very clear type on the point system.

HOW STRAWBOARD FACTORIES KILL FISH.

A strawboard factory, in Indiana, has depopulated the fish in the White river. Thousands of dead and dying fish were seen recently decomposing in the hot sun. All kinds and sizes of fish were seen. The health board has taken the matter in hand and the fish have been taken away by a fertilizing manufacturer. The officers examined the dying fish and found that a sediment of a gluey consistency had practically closed the gills. It is the sediment from the strawboard mill and not poison. The sediment floats in the water and is taken up by the gills of the fish. There is no escape, and in a short time the finny inhabitants of the river die of strangulation, not poison. It is the minute particles of straw fibre that do the work.

AS SEEN BY HENRI BOURASSA.

The opinions of Henri Bourassa, M.P., are not always in harmony with the majority of his fellow-countrymen, but they are usually clear and definite, which is more than can be said of most politicians.

Mr. Bourassa's ideas on the pulpwood and colonization policy of the Quebec Government are as clear cut as his opinions on political questions. He says:

"Far from asking that 'Hon. Mr. Parent (or any other minister), should have a freer hand with regard to colonization,' I have urged that laws and regulations should be adopted which gave more liberty to both the lumberman and the settler and less arbitrary power to ministers and government officials, as well as less facilities for speculation. To that effect I have suggested the following reforms:

"1st. Let forest regions be divided from colonization townships. Exclude the lumberman (as limit holder) from the settlements and the settlers from the lumbering districts.

"2nd. In the forest regions, don't sell more limits than can be operated within a limited period; and during that period and within its limits, let the lumberman be free to carry on his trade, under the law, without any fear of encroachment by the settler and danger from fire.

"3rd. In the colonization townships let the land be sold free to the settler, with the timber left thereupon, and there also let the law be applied without partiality or favor. Suppress all the correspondence, inspections and delays which retard the sale of land. Give lands to all bona fide settlers who apply themselves for them; oblige them to clear a certain amount of land every year, and to live on their lot. When they don't comply with the law, let their title be annulled, ipso facto, and the land be offered again for settlement, and not for lumbering. And also let the bona fide settler be free to dispose of his timber as he likes.

"The root of the present evil lies in the fact that concurrent rights are given to the lumberman and the settler on the same property. Thus are brought into conflict two classes of men who should be natural allies. And once the conflict is created, politicians and speculators do their best to make it worse and permanent.

"As an evidence of the practicability of my suggestions, I may add that after having heard my remarks, the secretary of the Lumbermen's Association, Mr. Owen, said, before the Commission, that it was the most practical solution that had been offered, and that—due regard being given to some peculiar conditions in the Quebec district—the whole question could be settled within fifteen days."

PAPER FOR HALF-TONE CUTS.

Among the patents recently issued in the United States is one to Roger D. Smith, of Dedham, Mass., and Hugh A. Craigie, and William H. Holston, of Cumberland Mills, Me., for improvements in paper for half-tone cuts.

"Printers of magazines, illustrated books, catalogues, and the like," say the inventors, "demand for use in making process or half-tone cuts or prints a coated paper which shall possess an even surface, free from roughness or irregularity of any sort which may interfere with the reception of prints from the shallow plates employed in half-tone and other modern processes. Paper manufacturers have heretofore furnished for this purpose a grade of paper known as coated book or sometimes as fine cut-paper, so-called because adapted to the production of fine cuts or prints, which so far as smoothness and evenness of surface is concerned, meets the trade requirement; but the processes of manufacturing such paper, which have heretofore been regarded as indispensable to its production, have involved a final finishing or calendering of the paper, which leaves its surface hard, glazed, non-absorptive, and highly light reflecting.

"This highly polished light reflecting paper has been accepted and used by the printers, because it has been the only paper produced which possesses the requisite evenness for half-tone printing; but this glazed light reflecting paper has its disadvantages. It is incapable of yielding the soft and pleasing effects in a print which are peculiar to an unpol-

ished or "dead" smooth surface, and in printing solid or dark masses of shade or color on the glazed fine cut paper great care has to be exercised lest too much ink remains on the surface. The polished paper resists absorption of ink and will not hold the ink well enough to permit the application of as solid a color or shadow as the artistic printer desires without being liable to produce offsets—that is to say, transfers of surplus unabsorbed ink from the print to the opposite page of the book or to the tissue leaf sometimes interposed for protection. The printer is obliged to sacrifice part of the desired artistic effect and cannot obtain a good solid color.

"Critical examination of prints made on this glazed paper will detect the imperfect and streaky appearance of the more solid portions. Therefore and until the application of our new process to the manufacture of cut paper the printers and publishers have been obliged to suffer the above mentioned imperfections to pass in order to avail themselves of the indispensable smooth and even finish of the highly polished paper. By the employment of our new process herein to be described, the publisher can be supplied with a fine cut paper which possesses to a perfect degree the smoothness of surface which is demanded for process prints, and which also, unlike the paper heretofore furnished for the purpose, has a dead finish, which lends itself to the production of the most pleasing artistic effects and on which solid colors and shades can be perfectly printed with substantially no danger to offsets.

"Heretofore, magazines and books have frequently been made up of two qualities of paper, the polished and the light reflecting fine cut paper for those portions of the book which contain the process prints and a non-reflecting dead finished paper suitable to the printed text. Sometimes the entire book is printed on polished fine cut paper for the sake of uniformity, and in most cases the fine cut paper has been used both for process prints and the adjoining printed text. It is disagreeable to the eye to read from print on such polished paper, because there is usually a broad band of reflected light on some portion of the page. When the book is made up of two grades of paper, the resultant appearance of the book is unsatisfactory.

"In contrast to this, a book or magazine made entirely from our new fine cut paper is uniform in appearance, and the printed pages are agreeable to the eye, or if the book be made only partly of our new paper, the contrast between it and the ordinary dead finished text paper is not nearly so great as in the instances heretofore noticed. The contrast between the process prints made on paper prepared by our new process and those made on the old polished paper is very much like that between the modern platinum printed photograph and the old-fashioned highly glazed photographic portrait.

"In carrying forward our new process we take the desired grade of paper, which may or may not have been supplied with a filler during its manufacture in the paper machine, and before coating it in any way, subject it to a high pressure calendering, which compacts the paper body and gives it a smooth, even surface. Calendering, such as that known as supercalendering will produce the desired preparatory condition. The best results are obtained by passing the paper through a set of rolls under heavy pressure in such manner that with the pressure there is some rubbing of the rolls upon the paper. This step in our process yields an uncoated paper which is rolled or rubbed or rolled and rubbed to a smooth surface somewhat polished and light reflecting and which is in condition to receive a coat of glue size, albumen, or other adhesive vehicle for the clay, blanc fixe, or other suitable filler.

"The application of such a coating has heretofore in the manufacture of fine cut paper been preparatory to the final calendering, which produced the glaze or polish which our process wholly avoids. In our process the coating of, say, glue size and clay is the final step and is applied after the paper has been compacted and

smoothed, as by calendering. The coating, however, should not be so heavy with paper prepared by our process as with paper prepared in the old way, which called for a final calendering. We have found that a coating about half as heavy as that employed in the old process of making fine cut paper yields good results, while if our paper is coated as heavily as the old style, the coat is liable to form a cake on the surface of the paper. The application of the coating to our paper swells or plumps the paper body a little but not enough to impair its perfect receptivity to process prints. This swelling or stuffing of the paper body renders it faintly absorptive, so that the heaviest shades of ink can be evenly printed thereon with but little danger of offsets. The paper thus prepared is lighter for its bulk than the old style of fine cut paper, a quality which still further renders it valuable to the publisher. After our paper has been calendered and coated, it is dried and ready for the market."

Mill Matters

It is reported that the St. George, N.B., Pulp and Paper Co. will build a paper mill at that place.

The Menzie Wall Paper Co., Toronto, gives notice of a by-law reducing the number of its directors from five to three.

The Toronto Paper Mills, at Cornwall, had to close for two weeks in consequence of the unwatering of the canal for repairs.

J. S. Larke, Canadian commercial agent for Australia, reports that on a steamer that recently arrived, there were 1,304 packages of paper and matches, mostly of Canadian manufacture.

The E. B. Eddy Company will suffer no trouble from shortage of pulpwood this season. Jobbers have been very successful during the past winter, especially in getting out stuff for the Eddy Co., and James Klock got out an unusually good supply in the Temiscamingue country, the Gatineau and Coulonge countries.

The Royal Pulp and Paper Co. is about to instal new machinery to increase the output of their mill, at East Angus, Que.

An enquiry has been made, through Lord Strathcona, High Commissioner, for the names of the largest paper manufacturers in Canada, especially makers of printing papers, who are in a position to ship to Valparaiso. The enquiry is made by a gentleman now on a visit to England from South America.

The men in the Riordon paper mills, at Merritton, went out on strike on the 4th inst. The proprietors desired to return to the schedule of hours at the week end, formerly ruling, making the hours as at present prevailing in the Eddy and other mills. The men objected, and struck, but the proprietors will carry out their policy. Meantime, the mills are in partial operation and advantage will be taken of the lull to effect repairs.

George S. Cushing, says the Paper Mill, had the idea that the refuse of his sawmill would be good enough to make pulp from, seeing that the timber cut into boards there was chiefly spruce. This idea had strong possession of his mind, when he took the initiative in the forming of the Cushing Sulphite Fibre Company. Edgings and slabs were to be used in that mill. A year or two ago he retired from the company, and lately the value of the raw material supplied from his sawmill to the pulp mill was made the subject of an action at law. He still adheres to his theory, and believes that even the bark of the spruce can be utilized as material for pulp. To test the matter, he has had experiments carried on in a small building erected for the purpose near his sawmill, machinery having been put in. It is reported that he has succeeded in making pulp from bark, not a fine pulp, but one that would produce paper. Some thousands of dollars' worth of machinery has been put in the miniature works, which might perhaps be more appropriately named a laboratory. A fairly large quantity of pulp made from slabs and edgings is turned out and readily sold.

The mill, which the reorganized St. Raymond Paper Co. will erect, will have a capacity of twenty tons of paper and thirty tons of pulp daily.

The British American Pulp, Paper and Railway Company is applying at Ottawa for an act to extend the time for the completion of the railway and branch lines authorized by section 10 of chapter 89 of the statutes of 1900.

The British schooner Onyx arrived at Portland, Me., April 27th, with a cargo of 223 tons of wood pulp, from Port Medway, Nova Scotia, for the Great Northern Paper Company, of Millinocket. Nearly 400 tons of wood pulp arrived there that week from the Maritime Provinces for the Great Northern Paper Co.

W. D. Woodruff, president of the Lincoln Paper Company, of St. Catharines and Merritton, has been elected a director of the Princess Estates Co., recently organized. His election completes the directorate of the company, which includes Wm. German, M.P., of Welland; George H. Dunbar, and Henry E. Grant, of Buffalo; Hon. John Woodward, Hon. John S. Lambert, and Fred. R. Green, of Fredonia. The company owns considerable property in the new industrial centre being created at Niagara Falls, Ont.

The Telfer Paper Box Mfg. Co.'s factory, at Toronto, was pretty well destroyed by fire on May 12th. When discovered, the fire had gained considerable headway and before it was mastered the interior of the factory was badly damaged. Some of the machinery was not much injured, but the stock, which was not burned, was badly damaged by smoke and water, entailing a loss of about $20,000. The building, which was a new one, was completed and occupied on July 2nd, 1902. It cost $18 500, and was insured for $13,000. The machinery cost $12,000, and plant and stock were insured for $22,000. The cause of the fire is unknown. The company manufactured largely for the T. Eaton Co., the Robert Simpson Co., the Crompton Corset Co., and the Eclipse Whitewear Co., besides other consumers of paper boxes. It is the intention to rebuild.

The Cushing Sulphite Fibre Co.'s mill has started up again.

An Englishman, resident in London, and having several years' experience in the stationery and paper trade, writes us that he would be glad to represent a Canadian paper mill in the British market in printings, writings, etc. The address can be had through this office.

Surveys are to be made of the water power at the Chaudiere Falls, Ottawa, with a view to regulating and controlling the water. Experts express the opinion that water capable of developing 200,000 h.p. is going to waste. The Eddy paper mills and other industries are frequently short of water in the winter, when the channels become blocked with ice, and in summer, when the water is low, while in the spring they have too much. A system of dams and reservoirs to hold back the spring flood and release it gradually, later on, is proposed, and it is hoped the Government will undertake the necessary surveys this season.

The Quatsino Power and Pulp Company, for which 100 square miles of pulp lands, lying between Quatsino Sound and Broughton Strait, were reserved about two years ago, are preparing to begin active operations. The bulk of the pulp lands has been selected and the company is just about to let a contract for the erection of a wharf, sawmill and pulp mill and other buildings, at or near the narrows of Quatsino Sound. The sawmill will have a capacity of 50,000 ft. per day, and the pulp mill will turn out daily 65 tons of ground pulpwood, provision being made to increase the capacity to 125 tons per day within the next two years. The company will require quite a fleet of tugs, barges and other vessels to convey freight, supplies and logs to its mills. The estimated initial expenditure will be about $150,000 for sawmill, pulp mill, wharves, etc., and it is the intention to establish a paper mill as soon as circumstances warrant the additional outlay. Altogether the company is preparing to invest $500,000 in the enterprise.—B.C. Lumberman.

Soft coal has taken the place of wood for heating and drying at the Sturgeon Falls paper mill.

The Hawkesbury sulphite pulp mills have orders for months ahead, and have plenty of logs and power.

The Great Lakes and St. Lawrence Transportation Co. has contracted with the Battle Island Paper Co. to carry, during the present season, 30,000 cords of rossed pulpwood from the latter company's limits in Quebec, to their mill at Fulton, by Oswego and the canal. There was an agreement to carry 25,000 cords last season, but owing to the rossing mill not being completed till late in the season, and other causes, only 17,000 cords were delivered, and additional shipments by rail had to be made during the winter at higher freight rates.

The paper makers of Hull have formally abandoned the fight with the E. B. Eddy Co., as is apparent from the manful confession in the following resolution, passed by their lodge, No. 35, International Brotherhood of Paper Makers, at the last meeting: "That we discontinue the fight for shorter hours, which has been in operation since January last. We would ask that any hard feeling that may have arisen through this trouble be allowed to drop and the same cordial relations shall exist between your company and the former employees that existed previous to this trouble."

A British firm, whose address can be had on application to this office, writes the Pulp and Paper Magazine as follows: "We are exporting large quantities of papers to Eastern Asia, and we find that the cost of freight, etc., is much less from Canada, if the mills, which are situated near railways, can compete with the Swedish and Belgian mills. We export white news, brown wrappings, blue match, white printings, etc. We should think you ought to be able to compete in news and browns. The size for the latter is usually 37 by 49, 45 lbs. per ream of 500. If you have any good mills near you, we shall be obliged if they send samples and prices f.o.b. Vancouver."

The B. Greening Wire Co., Limited, of Hamilton, Ont., report that there is a steady growing demand for the wire barrel hoop in place of the old-fashioned elm hoop, the coopers find such a difficulty now in getting material suitable for the wooden hoops. Not only has the price advanced to an enormous extent, but it is practically impossible to get enough stock of suitable quality to supply the larger cooperage shops. The consequence is that in trying to use inferior stock there is a very serious loss of time and annoyance both to the cooper and shipper. The wire barrel hoop consists of a piece of No. 9, 10, 11 or 12 gauge steel wire with the ends twisted together, and the B. Greening Wire Co., Limited, claim their hoops are now made in a perfect circle, thus enabling them to slip down over the barrel into their place without binding at any particular point. The price is as low or lower than the wooden hoop. The wire hoops are now successfully used on flour, sugar, salt and apple barrels, and are coming into use on barrels for general merchandise.

THE GREAT TORONTO FIRE.

In the last issue of the Paper and Pulp Magazine, mention was made of the great fire in Toronto, the ashes of which were not then cold, and which practically wiped out the wholesale stationery and paper trades in that city. We are able now to give a complete list of those in the trade burned out, with, in most cases, their present business addresses, losses, and other information. Nine large concerns were burned out, the losses being almost total, and as Toronto has been the headquarters for the stationery trade in Canada, the loss, direct and indirect, spreads far beyond the borders of the city, and has entailed much inconvenience among publishers and others, who required paper for their operations. The actual money loss in property destroyed cannot be far from $1,500,000.

The following are the firms which were burned out:

Warwick Bros. & Rutter, wholesale stationers, bookbinders, contractors for Ontario Government printing, etc.; 265 hands; loss on building and stock, $200,000; insurance, $150,000. Will rebuild, contracts being already let. Have secured temporary quarters for printing office at Johnston's Lane. Offices, 26 Victoria Street.

Brown Bros., wholesale stationers, bookbinders, etc.; 250 hands; loss, $235,000; insurance, $150,000. Have bought out manufacturing department of Wilson, Munroe & Co., and are carrying on business in their premises, 77 York street. Office, 96 Yonge street. Will rebuild, probably on another site.

W. J. Gage & Co., wholesale stationers, binders, book printers and publishers; 175 hands; loss, $275 000; insurance, $215,000. Getting new machinery from New York, and will rebuild. Temporary premises, Victoria Rink, Huron street.

Copp, Clark Co., stationers, binders, publishers, printers, etc.; 165 hands; loss, stock, $140,000; building, $40,000; insurance, $125,000 and $20,000. Will rebuild. Temporary premises, 69 Colborne street.

Rolph, Smith Co., engravers and lithographers; 70 hands; loss on building and stock, $125,000; insurance, $80,000. Site sold to W. R. Brock Co., and have amalgamated with the Clarke Lithographing Co., and a new company will be formed. 26-30 Lombard street.

Barber & Ellis Co., wholesale stationers, envelope and paper box manufacturers; 180 hands; loss, stock, $110,000; building, $40,000; insurance, $120.000. Office, 501 Board of Trade Building. Warehouse, Granite Rink. Will remove their manufacturing branch to Brantford, where they have purchased the Bicycle Supply Co.'s building.

Kilgour Bros., manufacturers and printers of paper bags, wrapping paper, flour sacks, paper boxes, twines, etc.; 180 hands; loss on stock and building, $140,000; fully covered by insurance. Their warehouse was gutted, but the five-story factory in rear, being provided with automatic sprinklers and water curtains over the windows, was saved. This building prevented the fire from spreading further in that direction. Are rebuilding warehouse. Temporary office, 19 Wellington street West.

E. B. Eddy Co., Toronto branch of mill, at Hull, Que.; loss, $60,000; insurance, $45,000. Three carloads of paper were on their way from the mill at the time, and escaped. Temporary office, 9 Front street East.

Canada Paper Co., paper manufacturers, Toronto branch warehouse; loss, stock, $40,000; building, $12,500; insurance, $32,000 and $10,000. Temporary office, 405 Board of Trade building. Having large stocks at their head office, in Montreal, and at their mills, Windsor Mills, Que., there was no interruption to business. Before the fire was over, orders had been sent on by wire to the head office.

Buntin, Reid & Co., wholesale stationers, paper and envelope manufacturers; loss, $50,000; insurance, $40,000. Have leased three stories over Metropolitan Bank, King street East, for six months, and will rebuild elsewhere.

Davis & Henderson, wholesale stationers and manufacturers; 60 hands; loss, $23,000; insurance, $50,000. Will rebuild, Temporary premises, Mail building.

Ritchie & Ramsay, manufacturers of coated papers and cardboards, works at New Toronto. Are looking for new premises. Temporary office, 8 McKinnon building.

Kinleith Paper Co., mills at St. Catharines. Temporary office, 8 McKinnon building.

Lincoln Paper Mills Co., mills at St. Catharines and Merritton; loss on stock, $7,000. Temporary office, Room 100. Board of Trade building.

Ryrie Paper Co., manufacturers' agents in pulp and paper; loss covered by insurance. Temporary office, 70 Victoria street.

Blackhall & Co., bookbinders; loss on stock and machinery, $10,000; insurance, $7,500. New premises, 56 Church street.

Carter-Crume Co., manufacturers of

counter check books; 25 hands. Re-established in City Dairy building, Spadina Ave.

Office Specialty Co.; loss on stock, etc., $5,000; insurance, $5,000. Their factory being at Newmarket, and branches at a number of places, they had ample stocks to fall back upon. Their place of business, next the Telegram office, was the only building burned in that block on the east side of Bay street. Are rebuilding. Temporary premises, 55 Yonge street.

Harris Lithographing Co., lithographers; loss, $5,000; insurance, $3,000. New premises, 68 Wellington Place.

E. Barber & Co., printers. New premises, 261 Adelaide street West.

W. Bryce, wholesale books, stationery and fancy goods; loss, $65,000; insurance, $45,000. New premises, 551 Queen St. West.

J. L. Morrison, bookbinders' machinery. Temporary office, 19 Wellington street West.

Addison & Mainprice, printers; loss, $12,000; insurance, $5,000. St. Lawrence Hall, King street East.

Book Supply Co. (J. M. Poole & Co.) publishers and printers.

The above figures relating to losses and insurance are in many cases only approximate, as the losses are not yet adjusted.

S. Frank Wilson, publisher of Truth, and other publications, was the owner of one of the burned premises on Front street. He will rebuild.

Among the books destroyed at Brown Bros. was the University of Toronto Year Book in its unbound form. It had just arrived from R. G. McLean's printing office, who had the contract for printing the book, while Brown Bros. had the contract for binding. The Year Book Committee had placed no insurance on the books. The price to be paid McLean was in the neighborhood of $1,500, and he claims that he was released from all liability when he delivered the books to Brown Bros., and that he is entitled to be paid for the work. There were 200 of the books previously delivered.

THE SCANDINAVIAN PULP COMBINE.

It may now be considered, says the Svensk Papperstidning, that the attempt to organize a common sales office, in Great Britain, by the mechanical pulp manufacturers has now stranded indefinitely, and the chemical pulp manufacturers have not much better prospects of success. This is to be regretted for more reasons than one. From various indications, it seemed that, if the Scandinavian manufacturers had been able to arrange a well organized and carefully managed combined sales office, this would have had a steadying effect on the market, and would have given it the stability which it needs so much. Even to the paper industry, it would have been beneficial, and might have given a better tone to the price of paper. Although some paper mills, under ruling circumstances, which possibly may now continue, have been able to buy pulp at job prices, the average result is worse than if fairly steady prices for the raw materials could be reckoned on.

A more favorable opportunity for starting a combined sales office one could not have wished. The conditions have been such that each manufacturer must have said to himself that something ought to and should be done. The threat from Canada has, for the time being, lost its point, but, if it should return, it is evident that a well organized union between the Scandinavian pulp manufacturers would have had more power to resist competition from another country than if each individual had to fight the competition apart from all the others.

From another point of view this failure is still more to be regretted. For many years the manufacturers have loudly complained of the unfavorable conditions as regards selling from which they have had to suffer, and after they have tried all sorts of useless remedies they, at last, take steps to effectually cure the evil—and fail miserably. This must have a very demoralizing effect, and shows the lack of determination and vigilance of the pulp manufacturers. It is, too, the

best proof to the middlemen speculators that they may continue, perhaps, more than ever, to treat the pulp makers just as they like. It is evident that a renewal of the negotiations, which have now fallen through, cannot be made in the near future.

CANADA'S PAPER AND PULP.

The publication of the trade and navigation returns for the three-quarters of the year ending March, makes a convenient occasion for taking stock of trade tendencies in pulp and paper manufactures.

For the nine months our total imports of printed books, pamphlets, and periodicals, were $658,219, of which $3,238 came in from Germany under the surtax, and $134,866 from Great Britain, under the preferential tariff, and $9,674 from Great Britain under the general tariff, presumably of foreign printed books imported through British houses. Of the total of $520,115, under the general tariff, the United States contributed $483,507, and France, $25,649. This did not include fiction and other literature imported in sheets of which Canada took from the United States, $60,503, and from Great Britain, $10,465 out of a total of $71,827, the amount brought in under the surtax being $75. In commercial printed forms, such as notes, bank bills, blank forms, etc., we imported from the United States, $55,576, from Great Britain, $5,154 and Germany about $500, out of a total of $62,112. In posters and advertising bills our imports are mostly from the States from which we took $17,955, against $1,363 from Britain under the preferential, out of a total of $19,565. In labels, such as cigar box labels, labels for tinned fruit, etc., the trade is in the same position, the United States sending us $73,061, against Britain's $12,878, while Germany, even under the handicap of the surtax, gets in these goods to the amount of $11,019, the total of this class of goods being $101,805. Of maps, we get $11,058 from the United States, against $2,764 from Britain and $46 from Germany. Of advertising pamphlets, show cards, catalogues and circulars, we take from the United States, $57,841, and from Britain, $6,809, plus $1,137, under the general tariff, presumably of German origin. Of chromos and colored advertising matter, we took from the United States, $3,015, from Britain, $1,254, and from Germany, $399. In printed music our imports were: $44,719 from United States, $12,236 from Great Britain, and Germany, $2,542; while in photographs, artotypes, paintings, drawings, prints, etc., they were $166,514 from the United States, $29,847 from Britain, and $32 914 of German origin, out of a total of $248,225.

In most of the cases given, the total attributed to Germany includes the imports from the United States and Great Britain, of German goods which are subject to the surtax. It may here be remarked, however, that a considerable quantity of goods in the paper line that are of German origin, slip in under the general tariff by having fraudulent English water marks or else are done up in English style after arrival in England, preparatory to re-export to Canada. This is a great difficulty in the textile as well as the paper trades, and is a fraud upon the honest importer, as well as upon the Government.

In unprinted papers, out of about $80,000 of papers for photographers' use, $74,640 are imported from the United States, against $3,056 from Britain, and $658 from Germany. Of paper bags and sacks, $26,977 come from the United States, $121 from Great Britain, and $1,543 from surtaxed Germany. Our imports in cardboard, in sheets or cut to size, are, from United States, $33,881, from Great Britain, $3,130, from Germany, $1,529. Of envelopes, we get $24,387 from the United States, $11,149 from Great Britain and $680 of German goods. Of paper felt or strawboard the imports are: United States, $69,936; Great Britain, $383; other countries, $131. Wall paper is overwhelmingly in the hands of the United States makers, who sent in the nine months 1,414,597 rolls, valued at $111,285, against 28,981 rolls valued at

$7,535 from Great Britain, and 16,195 rolls worth $2,208, from Germany. Leatherboard or leatheroid is supplied to Canada entirely by the United States, which shipped $16,784 in the nine months. The imports of mill board were $20,007 from the United States, and $1,563 from Great Britain. The trade in paper pads, papier mache ware, and like manufactures of paper is also nearly monopolized by the United States, which sent us $340,955, while Great Britain sent $82,828, and Germany, directly and indirectly, $18,081. Printing paper costing 2¼ cents per lb. or less, and dutiable at 15 per cent., is supplied wholly from the United States, the imports being $1,198. In other printing paper dutiable at 25 per cent., the imports were: From the United States, $191,217; Great Britain, $78,927; Germany, $2,073; other countries $984. Under the head of "ruled, border and coated papers, and papeteries and boxed papers." Canada's imports were: From the United States, $60,377; from Great Britain, $23,822; from Germany, $2,184, and other countries, $17,549. Of strawboard, in sheets or rolls, the imports were: United States, $5,945; Great Britain, $30; and of wrapping paper, $20,939 from United States, $2,000 from Great Britain, $928 from Germany, and $3,499 from other countries. Of all other kinds, our takings were $249,978 from United States, $91,898 from Great Britain, $5,709 from Germany direct, and $8,304 indirect, and from other countries, $29,103.

The above figures do not include books, etc., imported under the free list, amounting to over $300,000, in which the United States leads, with Great Britain second.

It may surprise some to know that Canada imported wood pulp, dutiable at 25 per cent., from the United States, to the value of $34,997, and under the surtax tariff, $334, this latter coming via United States ports. Our imports of rags (free of duty) were: United States, $108,361; Great Britain, $101,813; Germany, $30,319, and other countries $15,269.

Turning to the export side, the exports of pulp "blocks" or logs recorded in the nine months ending March were: To the United States, 298,161 cords, valued at $1,205,089, and none to other countries. We shipped to the United States, Canadian-made wall papers to the value of $1,759; to Newfoundland, $5,358, and to other countries, $14,338, so that our wall paper factories have entered the export field with fair prospects. We also shipped other papers of Canadian manufacture as follows: To Great Britain, $296,522; to the United States, $82,952, and to other countries, $338,454, making a respectable total of $717,928, besides $9,015 shipped from Canada of other makes of paper.

Our exports of wood pulp in the nine months were as follows, all being the produce of Canada: To Great Britain, $415,915; to United States, $1,356,780; other countries, $28,578.

ARBITRATION IN THE BRITISH PULP AND PAPER TRADES.

The following circular has been issued to the trade in the Old Country:

It was recently resolved by the Papermakers' Association of Great Britain and Ireland and the British Wood Pulp Association to set up a Joint Arbitration Committee for the settlement of trade disputes—especially those relating to wood pulp—and the undernoted gentlemen have been selected to act viz.:

Appointed by the British Wood Pulp Association—J. Y. Henderson, F. Becker, W. J. Mather, C. D'Oyley Mears.

Appointed by the Papermakers' Association—C. R. Seddon, Joseph Dixon, A. L. Poulter, Neil Turner.

The functions of the committee will be:

(1) To consider any dispute which may be put before them. Such dispute to be submitted, if possible, on a form mutually agreed by the parties. Failing this, both parties to send in a submission form.

(2) The duty of the committee will be to appoint a suitable person to decide the matter in dispute, whose decision shall be final.

(3) The committee, as mentioned above, will consist of eight members—four ap-

pointed by each association, and three will form a quorum.

(4)The fees will be settled by the committee—a percentage of which will be set aside for the committee expenses.

The object is to obviate the trouble and expense of each side having to appoint an arbitrator, with the additional expense very often of an umpire, especially in the case of small and trifling disputes, and further, to obviate, if possible, the risk of arbitrators becoming the advocates for those who appoint them.

The committee, knowing the nature of the dispute, will appoint the person whom they consider best qualified to deal with each particular case. If it is a point of law they would most likely appoint a lawyer accustomed to deal with mercantile or marine matters, as the case might be. If a question of quality—a practical man. If trade custom, they would appoint the person with most knowledge and authority on same, and so on.

It is the intention to keep the fees as low as possible, but it is impossible to tabulate any scale at present.

Appeal to this committee is entirely voluntary, but if it works satisfactorily it might be desirable to make it compulsory later on by embodying a clause in the contract notes to that effect.

T .H. Edwards, 5 Laurence Pountney Lane, Cannon St., London, E.C., is acting secretary to the committee.

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—Sven Hedin has furnished additional evidence of the Chinese invention of paper. On his recent journeys, he found Chinese paper that dates back to the second half of the third century after Christ. This lay buried in the sand of the Gobi Desert, near the former northern shore of the Lop Nor Sea, where, in the ruins of a city and in the remnants of one of the oldest houses, he discovered a goodly lot of manuscripts, many of paper, covered with Chinese script, preserved for some 1,650 years. The date is Dr. Himly's conclusion. According to Chinese sources, paper was manufactured as early as the second millennium before the Christian era. The character of the Gobi Desert find makes it probable that the making of paper out of vegetable fibres was already an old art in the third Christian century.

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—Within the past few years many European and American machines have been introduced into the paper mills of Japan, and the most important mills are well equipped. As to raw materials, rags, straw pulp and chemical wood pulp are chiefly used. A difficulty in the matter of Japanese imports is that the bulk of the business comes through commission houses. Many complaints now made would be avoided if European paper was handled by firms having a technical knowledge of the business. The imports of paper into Japan in 1899 amounted to two million yen (the yen is about 50c.); in 1900 the value increased to 4,400,000 yen; but in 1901 it declined to 2,300,000 yen. Germany ships largely to Japan, followed by Great Britain, Austria, France and Belgium.

PULP MARKET.

Montreal, May 18th.

The demand for paper stock of all kinds, except bagging, continues active. Cotton rags, particularly blues and thirds, are still scarce. Mills making building and roofing paper are all in active operation, and all available roofing stock and waste papers are being shipped for this purpose. A considerable quantity of roofing stock is arriving from Great Britain, otherwise there would be a shortage in this line.

Manila rope is about steady. Collections are coming in slowly. Bagging is still almost unsaleable.

The better grades of new cuttings are all closely bought up. American mills appear to be ready to take all of these that they can get.

Domestic white rags	$2.00 to	$2.10	per 100
Mixed bagging	55 to	65	"
Blues and thirds	1.25 to	1.30	"
Dark cottons	75 to	90	"
Roofing paper stock..	50 to	55	"
Waste papers	35 to	45	"
Hard white shavings.	2.00 to	2.10	"
Soft white shavings..	1.00 to	1.50	"
Book stock	75 to	90	"
Manilla rope	1.75 to	2.00	"
Sisal and jute string	75 to	1.00	"
Flax tow	1.10 to	1.25	"

PAPER STOCK MARKET.

There is a fair call from the United States for Canadian mechanical pulp, while the demand in the home market is brisk. The trade for the future part of the season depends upon the water-power, which at present is ample everywhere. Canadian ground wood has sold at from $18 to $20 at Eastern United States mills, though the domestic article appears to be quoted in our trade contemporaries at

(See page 15.)

$17 to $18. For sulphite, there is a good demand, and the price in Canada is $1.90, net, and in the United States $1.95 to $2.10 delivered. The paper mills of Canada, running on news, printings and tissues, are busy, but those on book and writing papers are not pressed with orders.

Reports from New York show that the very strong demand for sulphite, both domestic and imported, is likely to continue.

The World's Paper Trade Review quotes sulphite, bleached, at £11 to £12; unbleached, 2nd quality, £8 to £8 5s.; 1st quality, £9 to £9 5s.; mechanical, wet, £2 2s. 6d.; dry, £4 5s. to £4 10s. for prompt delivery.

MARKETS.

At the recent annual meeting of the Association of Scandinavian Manufacturers of Chemical Wood Pulp, held at Stockholm, satisfaction was expressed that the American demand had given great firmness to prices. Whereas in former years large stocks existed, they had now been cleared off and makers were also well sold for 1905. The following prices, c.i.f., London, were submitted as being obtainable: Sulphite, best bleached, £8 15s. per ton; sulphite, ordinary strong, £7 15s. to £8, and sulphate, unbleached, £7 16s.

Reporting on the wood pulp market in France, A. L. Grondal, of Paris, states that prices have an upward tendency. For mechanical and half-chemical pulps, buyers appear to be well covered for this year, and consequently do not respond to sellers' ideas.

C. W. Sutter, Dominion immigration agent, Edmonton, N.W.T., has received an enquiry from a well-known Ohio firm regarding the starting of a pulp mill on the river at or near Edmonton.

AMENDMENT OF QUEBEC CROWN LANDS ACT.

A bill, amending the act relating to Crown lands and forests, has been introduced into the Quebec Legislature this month by Premier Parent.

The following is a summary of its provision:

A free grant of a hundred acres, or a lot selected within a territory covered by a timber license, so as to obtain from the holder of the license the payment of a premium of fifty dollars under certain conditions, may be obtained by those

(See page 22.)

Manufacturers of full lines of

Pulp Wood Machinery

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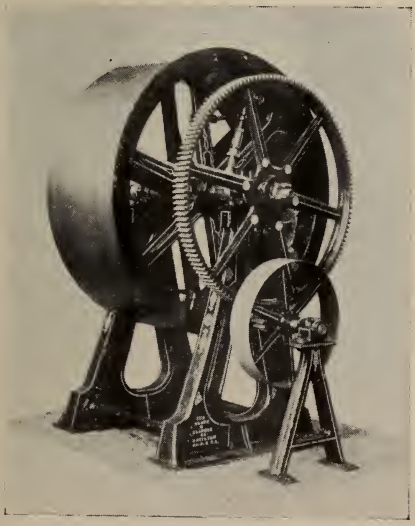
The WATEROUS Engine Works Company, Limited

BRANTFORD, CANADA.

THE BLACK-CLAWSON CO.,

HAMILTON, OHIO, U.S.A.



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who come under the operation of the Twelve Children Act, and who have not yet selected their lot. The applicant must declare whether he desires the grant for settling or to get the $50 premium. The department allows the license-holder 15 days to pay the premium. The lot cannot be granted for cultivation purposes from the date of paying premium for a term of fifteen years, during which it shall remain in the license unless cancelled earlier. Parents who had been entitled to the grant of one hundred acres must take the location ticket unless they apply for the premium. No sale shall be made for colonization purposes outside the lands intended for cultivation. The Crown agent shall be bound to sell a quantity of land not exceeding two hundred acres to any bona fide settler applying for the same. The Crown will not issue letters patent for more than three hundred acres of land for colonization by means of transfer unless in the case of lots that have passed by succession, "ab intesta," or by will or by judicial sale or sale for municipal or school taxes. Transfers of more than three hundred acres before the issue of the letters patent will be null and void. Sawmill owners and all engaged in the lumber trade must prove that timber in their possession is exempt from Crown dues. Timber cut in Crown location lots during clearing operations shall be exempt from dues. Licenses to work sugaries in Crown lands may be granted in a territory under timber license, but will apply to maple only.

THE ESPARTO TRADE.

An article in the Journal General on this trade says that the area under cultivation of esparto, in Algeria, is about seven millions of hectares (a hectare is 2.47 acres. It is particularly abundant in the department of Oran, where esparto tracts occupy all the high plateaux to the south of Sebdou, Daya, Saida and Frenda, and have a total superficies of

about four millions of hectares. Esparto is grown to some extent in the department of Algiers itself, but only in comparatively small quantities, in the neighborhood of Teniet-el-Haad, Aumale, the Bibans, Delfa, Bou-Saada, and Laghouat. In the department of Constantine, on the contrary, it is found in abundance to the west and the south of Setif, although not to the same extent as in Oran.

According to the customs returns, the total exportation of esparto in the year 1902 was 677,533 quintals, representing a value of 5,012,000 francs. The destination of the exports of grass could be roughly stated as follows:

France, 21,702 quintals, value, 150,000 fr.; England, 618,904 quintals, value, 4,580,000 fr.; Belgium, 6,178 quintals, value, 44,000 fr.; Spain, 30,749 quintals, value, 228,000 fr.

More than half the quantity exported was shipped from Oran, from whence 398,060 quintals were despatched during the year in question. The Algerians have for some time past had under consideration the possibility of establishing in the country itself some important industry of a remunerative character, the necessary raw material for which could be obtained on the spot. Many projects of this kind, having for their object the transformation of esparto into pulp, have been set on foot from time to time, but without success. The principal obstacles appear to have been the scarcity of water, and the want of fuel and the necessary chemical products required in the conversion of the grass into pulp.

In order to make a ton of pulp from esparto grass, it is necessary to have about a hundred cubic meters of water. Such quantities cannot readily be obtained in some parts of Algeria, and in order to ensure a permanent supply, it would be necessary to make some provision in the way of chutes. Then, again, with regard to fuel, Algeria is almost dependent on foreign sources for its supplies of this commodity. It has been stated that in English mills esparto can be treated with fuel at a cost of from 8 to 10 francs (? per 100 kilos.), whereas in Algeria a similar mode of treatment on the spot would probably cost from 25 to 28 francs. Under these circumstances local competition is hardly to be thought of.

So far as the necessary chemicals are concerned, such as soda and chloride of lime for washing and bleaching purposes, English mills procure these at from 20 to 24 francs per 100 kilos., whereas Algerian manufacturers would have to pay about 30 francs for the soda and 25 francs for the chloride. The raw material for the production of these chemcials is found in Algeria, but it has not yet paid to manufacture them, seeing that there is not the least local demand.

Nevertheless, in spite of these adverse circumstances, the writer does not altogether despair of a practical solution of the question in the near future. He says that the day when the French papermakers find themselves under the necessity of employing esparto pulp in large quantities, for which they will be able to offer remunerative prices, will also see the development in Algeria of the esparto pulp manufacturing industry that has so long been under consideration; it will at once open up the country, and furnish an industrial material that will put the Algerians in a position to break up the monopoly that has been so long held by English papermakers.

BRITISH CHEMICAL MARKET.

The home demand has been unsatisfactory, and the export business has not been quite up to expectations. The heavy alkali branch is dull. Bleaching powder is unchanged, but is only selling slowly. Caustic soda has not much enquiry, and orders have recently been booked at easier prices. Ammonia soda moves steadily, and soda crystals have a fair demand. Salt cake is quiet, but firm.—Paper and Pulp.

J. R. Booth, the veteran lumberman—now also a pulp manufacturer—of Ottawa, celebrated his 77th birthday on the 5th inst.

INDEX TO ADVERTISEMENTS.

—Warwick Bros. & Rutter, wholesale stationers, burned out in the Toronto fire, have decided not to rebuild on the old site on Front street, and have secured another site near the corner of King street and Spadina ave. The King street lot is about 45 by 110 feet, and the Spadina avenue lot about 85 by 230 feet. It is the intention to build a warehouse facing on King street, with the factory in the rear. The reasons for moving are that the old premises had become too small, and that by building outside the congested district a considerable saving in insurance will be effected.

THE
PULP AND PAPER MAGAZINE OF CANADA

VOL. 2.—NO. 6. TORONTO, JUNE, 1904. $1 A YEAR. SINGLE COPY 10c.

Pulp and Paper Magazine

A monthly magazine devoted to the interests of Canadian pulp and paper manufacturers and the paper trade issued between the 10th and 15th of each month.

SUBSCRIPTIONS: Canada, Great Britain and the United States, $1 a year; to Foreign Countries, 5s. a year.

Changes of advertisements should be in the publishers hands not later than the 1st of the month, and, where proofs are required, four days earlier. Cuts should be sent to the Toronto office, by mail, not by express.

BIGGAR-SAMUEL, LIMITED,
PUBLISHERS
18 Court St., TORONTO. Fraser Bldg., MONTREAL.

—The Canadian Journal of Fabrics records an event of interest to the Canadian pulp trade—the establishment of the first Canadian factory for making artificial silk. It has been long known to chemists that the delicate fibre spun by the silk worm and by the spider was composed of cellulose, and cellulose is present to some degree in all woods, but in large proportions in such fibres as the mulberry, spruce, cotton, etc., but no successful attempt was made till 1885 to imitate the substance evolved in the miniature laboratories of these tiny creatures, and so prepared that when ejected from their spinnerets it instantly hardened into the lustrous, strong and elastic fibre that goes to make up our beautiful silk fabrics. Even when the chemist had laboriously worked out his processes by a long series of separate operations it was found that the artificial fabric was deficient in some of the admirable qualities of the real silk. It was not so strong as the true silk, nor so elastic, and, moreover, it was highly inflammable. Since the experiments of Chardonnet, the pioneer chemist in this line, the product has been much improved, and factories employing several hundred hands each exist in Germany, France, Austria, and England. One has been established at Philadelphia, and a Canadian branch of this, employing about a dozen hands, has been opened at Toronto Junction. This is known as the General Artificial Silk Co., and employs the Stearn process developed in England. It produces silk suitable for dress goods, laces, tapestries and braids. The raw material used in the Philadelphia and Toronto Junction factories is spruce, but this spruce is imported from Sweden, the silk-makers claiming that the way in which the Swedish firm prepares the pulp makes it more suitable for their purposes. As the spruce of Canada is equal to the best in the world, and superior to that of most spruce growing countries, and as it appears to

be only a question of method in preparing, no doubt some Canadian pulp manufacturer will look into the matter, with a view not only of supplying the Canadian and United States mill, but of furnishing silk pulp to manufacturers in Europe.

—The benefits of the South African preferential tariff will be extended to Canada from the 1st July of this year, the initiation of the new policy thus falling upon Dominion Day. We trust it will be a happy augury for the new era of intercolonial trade expansion. From the statistics already given in this magazine, it will be apparent that a large and expanding market exists in South Africa, Australia, New Zealand and other British colonies for Canadian pulp and paper—more especially the latter. This trade cannot be developed in a month or a year, but the returns are none the less sure through being somewhat slow, and the importance to Canadian manufacturers of developing these markets lies in their value at times when home trade is depressed. It has been the experience of the past that trade depression has seldom overtaken two widely separated colonies at the same time. When trade for instance has been booming in South Africa, it has been dull in Canada, and vice versa. It is the case at the present time between these two sections of the Empire. A little consideration will show Canadian manufacturers the immense advantage of having in a time of stagnant trade at home an open and profitable market abroad. It is the lack of such an outlet, at such a crisis, for home products that has made our lean years so hard upon us. The preferential tariffs of the colonies referred to bring a golden opportunity for Canadian paper manufacturers, and they will do well if they set seriously to work to cultivate the ground so favorably open to them. One present difficulty is that the home demand for paper is so large as to absorb the full output of our mills. In view of this, and of the fact that some of the pulp mills find no profitable market for their products, will it not be good policy for some of these pulp mills to install paper machinery and market their output in the form of paper instead of pulp. Where the mill is remote from sea or lake ports, the freight difficulty is always greater for a pulp mill than for a paper mill, owing to the greater difference in the weight of the product to be marketed. As mills have to be established farther back from cheap shipping points, this drawback will increase. If some of the idle pulp mills that are otherwise well suited were to make paper for the export trade, and get into the British colonial under the new preferential tariffs, a new era would open in this industry. There is not only the colonial market, but Canadian mills can share with the United States mills a growing market in Great Britain for certain lines of paper, and would have a field also in the European and Asiatic countries for a limited amount of trade.

Pulp & Paper Currency

Glasgow makes a profit of $7,500 a year out of waste paper collected on its streets.

According to the Sturgeon Falls Advertiser, there is uneasiness over an announcement that the Ontario Government will build a canal one-third of a

mile long to divert the water of the Sturgeon river into Lake Wahnapitae, to facilitate lumbering operations. The Advertiser states that Charles Beck, the lumberman, commenced the construction of this canal several years ago, but that in the spring of 1900 a High Court order was obtained enjoining any person from diverting the water from the Sturgeon river by canal or otherwise. The parties interested in obtaining this order included Edward Lloyd, Lmited, The Sturgeon Falls Pulp Co., Limited, and the Sturgeon River Improvement Co. The injunction still holds good and the parties interested are not likely to allow the work to go on as the Pulp Co.'s interests would thereby be jeopardized.

Rev. J. E. Watts Ditchfield, vicar of St. James'-the-Less, recently organized an industrial exhibition illustrating the trades and handicrafts of the borough of Bethnal Green, where the people make anything from a matchbox to a motor car. Among the exhibits envelope-makers displayed envelopes of which they have to finish 1,000 before they can earn sixpence. One of the most curious industries to which the exhibition drew attention is the making of frilled paper hats. Paper flower-making at 2d. per dozen is a popular home industry.

LITERARY NOTES.

The Tanuma Publishing Co., of Yokohama and Tokyo, Japan, are now issuing an illustrated monthly record of the war between Japan and Russia. No. 3 of the series, for which we are indebted to T. Okada, secretary of the Yokohama Chamber of Commerce, has a colored war map, which is not only well drawn and well lettered in English, but is printed on paper far superior to the majority of maps that issue from British or American presses. Besides about 60 pages of descriptive matter, with half-tone cuts and cartoons, there are a number of full-page plates on coated paper, showing that in photo-engraving the Japanese are as fully up-to-date as they are in the manufacture of paper and the conduct of war. Apart from these features and the clever cartoons, the most striking thing in the paper is the pictorial supplement, in characteristic Japanese colors, entitled "War and women—Amazons then, nurses now," showing in one panel a Japanese woman on horseback, sword in hand, as an emblem of the old regime, and in another panel the interior of a hospital tent, in which Japanese ladies are seen as nurses to the wounded soldiers. Though only an outline sketch, the figures are naturally placed, and show the skill of a true artist. The subscription to this interesting periodical is 50 sen per copy, or 5 yen and 30 sen per year, the foreign postage being 14 sen per copy extra. The sen is a Japanese cent, or 100th part of a yen, or dollar.

The Lockwood Trade Journal Co., 150 Nassau Street, New York, publishers of the Paper Trade Journal, announce the early issue of the 1904-5 edition of their directory of the paper, stationery and allied trades of the United States, Canada, Mexico, South America and Japan. A glance over the 1903-4 edition, which was the twenty-ninth annual issue, shows this to be a very complete work, giving the location, capacity and products of each paper and pulp mill known to exist in the territory covered, with lists of wholesale and retail paper dealers, stationers, booksellers of the United States. It also gives the wall paper manufacturers, paper bag makers and manufacturers of paper articles, such as butter dishes, pads, envelopes, etc., in the United States. The re-classification of the various mills and factories into special lists makes the work very convenient for reference, the street addresses in the case of large cities being given. This standard work is only $3 per copy.

The city council of Hamilton, through

John T. Hall, its assessment commissioner, has issued an illustrated handbook, with folding map, describing the advantages of the city as a place of residence and a centre of manufacturing. Seated in the midst of one of the most fertile districts on the continent, with access to the great stores of electrical energy at and around Niagara, and with a fine harbor at the head of Lake Ontario, Hamilton is rapidly gaining the eminence destined for it as a great manufacturing, commercial and residential city; and the array of facts in this instructive booklet must confirm the general faith in this destiny if such confirmation were needed.

The prospectus of the Peat Board Co., Limited, of Toronto, a copy of which is before us, shows a brown cover made from the peat fibre referred to in a recent issue—the first sample apparently of paper made in Canada from the fibre of native peat.

Personal

F. C. Carter-Cotton, proprietor and editor of the Vancouver News-Advertiser, has been sworn in as president of the council of the British Columbia Government. Mr. Carter-Cotton was Finance Minister in the Semlin Cabinet some years ago, and is a politician of experience and ability.

S. Charles Phillips, chief editor and proprietor of the Paper Maker and other London trade journals devoted to the stationery, printing and allied trades, has been on a visit to Canada, and returned to England this month via Montreal. Over the name of "Shadower" Mr. Phillips has written much on Canadian trade, and, no doubt, he has shadowed the Canadian mills to good purpose on this trip.

We learn that C. W. Rantoul has resigned the managership of the Imperial Paper Mills at Sturgeon Falls. Mr. Rantoul's reasons for resigning are, we understand, purely personal, his relations to the directorate having been of the most harmonious kind. His resignation will not affect the plans laid out for extension of the mills. Mr. Craig, the president, is still in Canada, but expects to return to the Old Country very soon.

On the night of the 19th inst. Hon. Geo. W. Stephens, of Montreal, died suddenly at Lac au Clair, where he had gone on a fishing trip. Mr. Stephens was a public man of high ideals, and freely spent his large means in advancing the interests of his fellow-citizens and in trying to improve the tone of public life. After serving in the city council of Montreal for years, he sat in the Quebec Legislature from 1881 to 1888, and was a member of the Marchand Government. After his retirement from public life he took a warm interest in the question of Crown Lands and timber limits, and was chief member of the first commission appointed by the Provincial Government to report upon the Crown lands and forests. This valuable work of Mr. Stephens has been summarized in recent issues of the Pulp and Paper Magazine.

Judson F. Clark, M.A., B.A.Sc., Ph.D., has been appointed instructor in Forestry by the Ontario Government. Dr. Clark was born at Bayview, P.E.I., in 1870, and, although he has spent several years in the United States, he has retained his Canadian citizenship, always hoping to return to Canada for his life work. After spending a year at Prince of Wales College, Charlottetown, he entered Ontario Agricultural College at Guelph, where he won the gold medal for general proficiency in 1895, graduating in 1896. The following two years he spent teaching on the staff of the college, after which he entered Cornell University for the study of forestry and physiological botany. He received the degree of M.A., and was appointed assistant in botany both in the regular course and the summer school in 1899. In 1900 he was appointed Fellow in Botany, and graduated as Doctor of Philosophy in 1901. A few months later he was appointed Professor of Forestry in Cornell, with leave of absence to study forestry in Germany. He resigned from the staff at

Cornell on the veto of the annual appropriation for the College of Forestry by Governor Odell in 1903, and received his present position as member of the National Bureau of Forestry at Washington, D.C. His new duties under the Ontario Government begin August first.

Mill Matters.

The Chicoutimi Pulp Co. is turning out 165 tons of dry pulp per day, and has five steamers in commission at the present time for shipping its pulp, which is all marketed in Great Britain.

The Riordon Paper Mills at Merritton are running one new machine and new hands are gradually coming in to take the place of the strikers. It is expected that in a few days the mill will be in operation to its full capacity.

We learn that the Jenckes Machine Co., of Sherbrooke, Que., have acquired the sole right to manufacture for the Canadian market the screwless screen plate holder, invented by the Blaisdell Screen Plate Co., of Oakland, Maine.

C. A. Meincke & Co., 97 St. James Street, Montreal, chemical merchants and agents for paper and pulp mill supplies, have been appointed selling agents for Hamelin & Ayers, the well-known manufacturers of pulp and paper felts, Lachute, Que.

The Sault Ste. Marie pulp mills are now running under the auspices of the new syndicate, the Lake Superior Corporation. The Canadian directors are C. D. Warren and N. W. Rowell, of Toronto, and Thos. J. Drummond, of Montreal, the first named being president.

The St. John Sulphite Co., Mispec, N.B., will go into voluntary liquidation. The British directors have sent out two men to inspect the mill. On a suit brought against the company by M. B. Edwards for an account of $293, a stay of proceedings was applied for at St. John and granted on the petition of Joseph A. Likely for the winding up of the company.

—About 25 girls, employed in the Canada Paper Box Factory, Montreal, went on strike as a protest against the dismissal of a foreman. R. Jellyman, proprietor, made the following statement: "In the interests of my business I found it necessary to dismiss the foreman and appoint another in his stead, as I must have one who is capable of controlling and exercising proper discipline, and having fair returns of work. Twenty-five girls, who have been under this man, demanded I should keep him. That I certainly would not do, as I am the judge of what I need in the conduct of my business, and they left their work; fourteen of them returned, and I am replacing the others, and business is being run as usual. There was no question of wages, hours or conditions."

—The question of reciprocal preferences is evidently not lost on the foreigner, who, perhaps, as time goes on, will show less disposition to ignore the country that buys so largely of his products. For instance, a suggestion is made by the manager of a Swedish paper mill that it may be beneficial for Sweden to buy from England instead of so largely from Germany. The latter country, it is pointed out, owing to a revised tariff, has practically precluded the importation of Swedish goods. Great Britain is Sweden's most important buyer of wood pulp, paper, boards, etc., and statistics show that in the matter of Sweden's imports, Germany overlaps England considerably. Considering the importance of the Scandinavian pulp and paper industry, our engineers, chemical manufacturers, felt manufacturers, and mill furnishers generally should find a good market in both Norway and Sweden, especially if the feeling of reciprocity is cultivated.—World's Paper Trade Review.

—A correspondent, reviewing the growth of the paper industry in the United States, in the past twenty years,

says: The increase in the number of establishments from twenty years ago until now has been unimportant, but the production has increased from $57,000,000 in value to about $130,000,000. The invested capital has been more than trebled, that is, it has been increased from $48,000,000 to $167,000,000. The amount paid out in wages has increased in that time from a little under $9,000,000 to nearly $21,000,000. The number of employees has been about doubled, namely, from 21,631 to 49,646. Investors in paper mills seem to be about as confident as ever, and are putting a great deal of money into mills, but it is to be noted in all these cases the investors are seeing to it that they obtain all their own raw material through the possession of sources of supply as well as in means of transportation from forest to factory.

—Sydney Bell, widow of the late B. T. A. Bell; J. E. Hardman, H. F. MacCarthy, S. MacCarthy and Archie F. May have been incorporated as The Review Publishing Co., with a capital of $20,000, to carry on the publication of The Canadian Mining Review and The Canadian Mining Manual, published by the late B. T. A. Bell, at Ottawa.

FOREST FIRE PREVENTION ALONG THE G.T.P.

The Secretary of the Canadian Forestry Association has received a reply from the Department of Railways and Canals to the resolution urging that care should be taken for the prevention of forest fires along the line of the new Transcontinental Railway, which was passed at the last annual meeting of the association. The reply says the Railway Department fully appreciates the importance of every precaution to prevent such fires in connection with the surveying of the railway. The G.T.P. Railway Company, acknowledging the resolution, says it has their full sympathy, and that their engineering department has been instructed to do what they can. A similar reply has been received by the secretary of the association from C. M. Hays, general manager of the Grand Trunk Railway, in reply to a copy of the resolution which was sent direct to him.

The Ontario Government has also adopted a clause to be inserted in all agreements of railway companies building lines through the newer districts of the province. It is as follows: "It is hereby agreed that wherever the line of construction of said railway runs through lands of the Crown which are not covered by timber license, and the Government deem it proper for the protection of the forest wealth adjacent to the line of construction to place on duty a staff of fire rangers for the protection of timber, it shall be at liberty to do so, and all expenses incurred thereby, whether for or in respect of men's wages, or any other services, shall be borne and paid by said railway company."

A similar clause is to be inserted in agreements as to licenses to cut timber.

Forestry and Pulpwood

The Beauce Pulp and Lumber Company, incorporated in the province of Quebec, has been authorized to increase its capital to $240,000.

The main drive of the Gatineau river has reached the mouth of that stream. It numbered 14,700 saw logs and 862 cords of pulpwood, the latter for the E. B. Eddy Company, of Hull.

An important auction sale of timber limits will take place at the office of the Minister of Lands, Mines and Fisheries, Quebec, on the 22nd inst. Some thousands of square miles of limits are to be offered in the Upper Ottawa, St. Maurice, St. Charles, Lake St. John, Saguenay, Bonaventure, Rimouski, Metapedia Valley, Grandeville and Gaspe districts.

A boom at the mouth of the White river was broken by a landslide recently, and allowed 150,000 logs, of which a large part were pulpwood, to scatter in Lake Temiskaming. Among the losers are J. R. Booth and the E. B. Eddy Co. A

similar mishap from high water occurred on the St. Maurice, where 160,000 logs escaped into the St. Lawrence, most of it pulpwood for export to United States mills. In both cases most of the logs were recovered.

The British Columbia Gazette contains a notice of a reserve placed upon certain lands for and on behalf of the Island Power Co., to select therefrom timber limits for wood pulp and paper-making purposes, according to an agreement entered into between that company and the Government. The lands involved are for the most part near the northern end of Vancouver Island and the reserve is for two years.

Reports from the Nipissing Country show that the Imperial Paper Company had a good winter, getting out a large cut of pulpwood, all of which will reach the mill in safety. About 300 men were employed in the company's camp during the winter. The cut of pulpwood in the district is far in excess of that of previous seasons. There was a great head of water in the streams, which made the driving of pulpwood easy.

The new Missassaga and Temagami forest reserves having been increased from 2,290 square miles to about 9,000 square miles, the fire ranging system will this year have to be greatly extended. During 1903 about $6,000 was required to pay the men engaged in looking after the reserves, but this year, according to estimates made by the officials of the Crown Lands Department, in the neighborhood of $18,000 will be required.

One morning recently the International Paper Company lost about 400 cords of pulpwood over Niagara Falls. It was part of the first cargoes that had come down the lakes this spring, and was lost because the men snubbed the raft too short near Schlosser Dock. Down over the fall the logs plunged and soon the surface of the lower river was covered with them. The current caught them and grouped them near midstream and slowly they floated down until they struck the water that rushes from the portal of the Niagara Falls Power Company's tunnel. This rush threw the mass of wood far over to the Canadian shore. There a small portion of it passed down stream, while the larger portion was caught by the up current and carried into the eddy at the Maid of the Mist dock. The loss to the comapny was considerable. Some of the wood that broke away was caught along the shore before it reached the fall.

Last year's cut of lumber in Newfoundland was 65,000,000 feet, of which 5,000,000 came from Labrador. This is over three times the cut of the year before, and the beginning of pulp making adds still further to this trade next year.

J. G. Scott, of Quebec, manager of the Quebec and Lake St. John Railway, has left for England to finance for the construction of the La Tuque branch, which is to run from a point eighty miles up the main line to the head of the St. Maurice river, and thence reach the La Tuque Falls, which have a waterpower capacity of ninety thousand horse-power, double that of the Grand Mere. On his return, in July, Mr. Scott hopes to be in a position to commence construction. The new branch will tap a large pulpwood area.

A quantity of poplar pulp logs, cut by H. B. Hetherington, for Mr. Todd, of St. Stephen, N.B., and stored on the banks of the Canaan river, were destroyed by fire, involving a loss of from $3,000 to $6,000. They were to have been driven to Cody's, cut into four-foot lengths, and exported to the United States. About one-third of the stock on hand was destroyed.

A Victoria correspondent of The Province reports that Seattle capitalists have taken up a pulp concession at Bella Coola Inlet, which is said to contain some 800,000 acres of fir, spruce and cedar, facing on tidal water, and all within a distance of two miles from water communication. The concession also includes two water powers with an aggregate of 20,000-h.p. It is likely that most of the timber will be taken out for pulpwood. C. H. Baker, president of the Snoqualmie Falls and White River Power Company, of Seattle, is president of the company,

and A. E. Williams, a Seattle lumberman, manager. The latter has purchased from Capt. J. W. Troup, superintendent of the C.P.R. coasting service, the steam launch Kootenay, which was the private property of the latter. She has been sent north to Bella Coola, where she will be used for cruising purposes. Besides those above named, there are interested in the pulp company: R. M. Thompson, secretary; J. B. Hart, A. H. Anderson, and W. S. Tanner. The company will be known as the Bella Coola Development Co. Development work is to be pushed vigorously.

PRINTING AND PUBLISHING TRADES.

The Montreal Star Publishing Company has been incorporated with a capital of $750,000. The incorporators are: Hugh Graham, Thomas McLeay Graham, William De Montmollin Marler, notary public; Herbert Meredith Marler, notary public, Montreal, and Alexander Murray, accountant, Outremont. The powers granted include the issue of The Star's publications, a general printing business, and the manufacture of pulp and paper.

As anticipated in a paragraph last month, the firm of stationers, lithographers, and printers formed by the amalgamation of Rolph, Smith & Co., and the Clark Lithographing Co., an outcome of the Toronto fire, has been incorporated under the name of Rolph & Clarke, Limited, with a capital of $500,000. The incorporators are: Joseph T. Rolph, Frank Rolph, Frank A. Rolph, Thomas J. Clark, and Herbert E. Miller.

The building which W. J. Gage & Company, stationers and printers, are erecting on the site of their factory, burned in the great Toronto fire, will be used for office and warehouse purposes only.

The printing business of Imrie, Graham & Harrap has been taken over by a company known as Imrie, Graham & Harrap, Limited, with a capital of $40,000. The provisional directors are Elizabeth Imrie, D. L. Graham and G. A. Harrap.

The Master Printers and Bookbinders' Association of Toronto has elected the following officers for the ensuing year: Atwell Fleming, president; W. P. Gundy, vice-president; Harry McBride, sec.-treas.; Executive Committee, A. F. Rutter, A. E. Chatterson, Geo. M. Rose, Richard Brown, S. R. Hart, Albert McCoomb, Fred Diver, T. Blaber, R. G. McLean, Rev. Wm. Briggs, D.D., John Murray, S. E. Hall, Richard Southam, H. L. Thompson, Andrew E. Whinton, Douglas Ford.

The name of Menzie, prominent in connection with the manufacture of window shades in Toronto, will henceforth be known in connection with other lines. The Menzie Wall Paper Co., of which R. E. Menzie is the leading spirit, has now in operation, at Mimico, or as it is sometimes known, New Toronto, a wall paper factory, which takes rank as the largest and best equipped in Canada. All kinds of wall papers are manufactured, from the common grades to the very finest pressed. The main factory is 300 by 50 feet, and a warehouse, 210 by 60 feet, is being added. The boiler and engine house, machine shop, mixing room for colors, etc., are entirely separate, thereby reducing risk of fire and preventing injury to the papers from dust, steam, etc. The factory contains eleven machines and has a capacity of 70,000 rolls a day. The motive power is steam, and the company has its own pipe line to supply water from the lake. The manufacture of burlaps and other decorations will also be taken up. The same parties, under the name of the Canada Brass Rolling Mills, of which John R. Barber, the well-known paper manufacturer of Georgetown, is president, are installing the machinery for a brass rolling mill, to make brass sheets, tubing, rods and wire, which is the only one of the kind in Canada. The recent tariff changes will give them the home market, and they expect subsidiary industries will be organized to manufacture various lines of brass goods from the raw material they will supply.

MECHANICAL WOOD PULP.*

By Stanislas Gagne, B.A., Sc.
(Continued from last issue.)

WET MACHINES.

Theoretically, when the pulp has been screened, the mechanical process of extracting and preparing fibres from wood is ended and the product is ready for the paper mill. This is actually the case when the pulp is employed immediately for the production of paper or cardboard, which some of our Canadian mills manufacture, but the large bulk is produced for exportation, and therefore has to be put into convenient form for handling and shipping. The wet machines are used to extract the pulp from the water, which holds it in suspension, and to turn it into sheet form containing a conveniently low percentage of water. Figures 32 and 33 are cuts of the types mostly used in Canada, and Figure 37 illustrates the principle on which they work. First, there is a vat A, into which the pulp is admitted from the screen trough; the cylinder B, partly submerged, is a frame work covered with very closely woven brass wire cloth which allows the water to pass through while the pulp it contains adheres to its outside surface, the couch roll C presses the felt D against the cylinder B, causing it to take up all the pulp adhering to the cylinder, leaving the wire cloth comparatively clean; the loaded felt then passes over roller E, which guides its direction over suction box F, which draws out part of the water in the pulp through the felt, over roller G, and between the press rolls H and K, the latter press out part of the water and the pulp gathers around the upper roll H. The felt, now unloaded, passes over stretch roll L, over roll M, is beaten by beater N, washed by sprinkler P, passes over guiding rolls O and R, between the rolls S and T, which press out the water it contains, over roll V, and again over cylinder B, taking a fresh load of pulp and so forth, continuously.

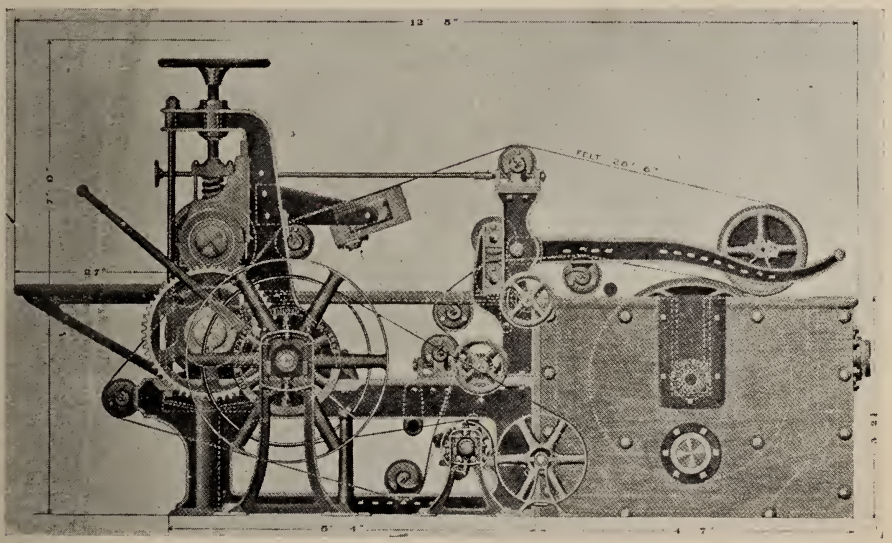
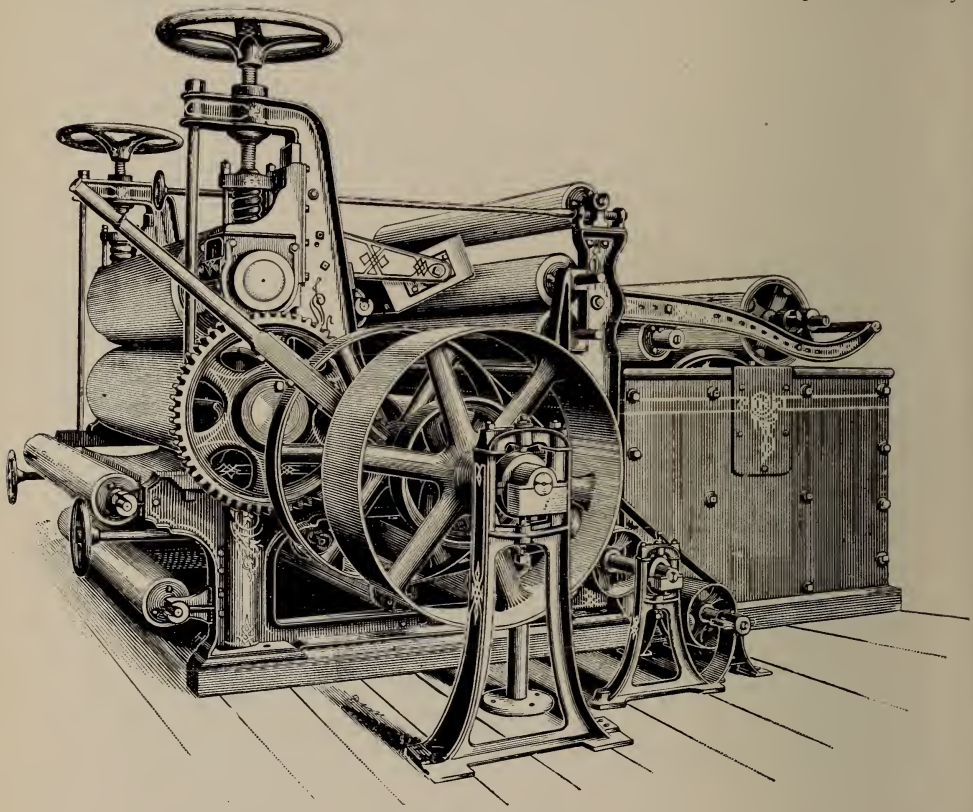


Fig. 32—Wet Machine, Waterous Engine Works. Co.

The vat A is made of ordinary pine, is water tight and provided with outlet pipes, etc. The cylinder cloth must be of very fine construction, so that no

*The above paper won the first prize given by the publishers of the Pulp and Paper Magazine for the best student's paper presented to the Canadian Society of Civil Engineers for 1903, the judges being members of the Society.

pulp will pass through the meshes nor adhere to it too strongly; the ends of the cloth should be sewn together and not soldered, as it is sometimes done, because, at such a soldered connection, water will not pass through, hence no pulp will adhere to that part of the cylinder, and a gash across the sheet of pulp will result with each revolution, thus decreasing the capacity of the machine. The couch roll C is usually made of cast iron and covered over with soft India rubber which facilitates the removal of the pulp from the cylinder B by the felt. The felt D is usually about 26 ft. long and 72 inches wide, and is woven in a continuous, endless form, of the best wool; grey ones made of Canadian wool, are well adapted for the work and give as good if not a better service than any. Most of the rolls are made of wood with the exception of the roll K. Much care is taken that the collecting roll H, which is formed from a solid piece of hardwood, is made perfectly true and is never allowed to dry, so that the surface will not be cracked nor split. The suction box is covered with a perforated plate, and as the felt passes over, the water is sucked down. Some advocate that the suction box should be connected with the draft tubes of the turbines, instead of suction pumps, but the disturbance and loss of power thereby caused exceeds that involved in the operation of pumps. Many mills prefer doing without suction boxes on the wet machines, leaving the work of driving out the water from the pulp partly to the press rolls and partly to the hydraulic presses; they claim that suction boxes wear out the felts much quicker, which seems to me reasonable, and it is a question whether they produce a drier pulp.



WET MACHINE.

The press rolls are tightened together by means of a spring and hand wheel at both ends of the collecting roll H, as seen in Figure 33, except in the case of that newly designed by the Jenckes Machine Co., of Sherbrooke, Que., where water pressure cylinders connected to lever arms at both sides of the machine do the work. This plan insures a more evenly distributed pressure between the two rolls and thereby a more uniform sheet. When a sufficient thickness of separate sheets of pulp have gathered on the collecting roll H, the attendant cuts the sheet with a "doctor" or knife, as shown in cut 33, or by means of a pointed stick of hardwood, which he passes

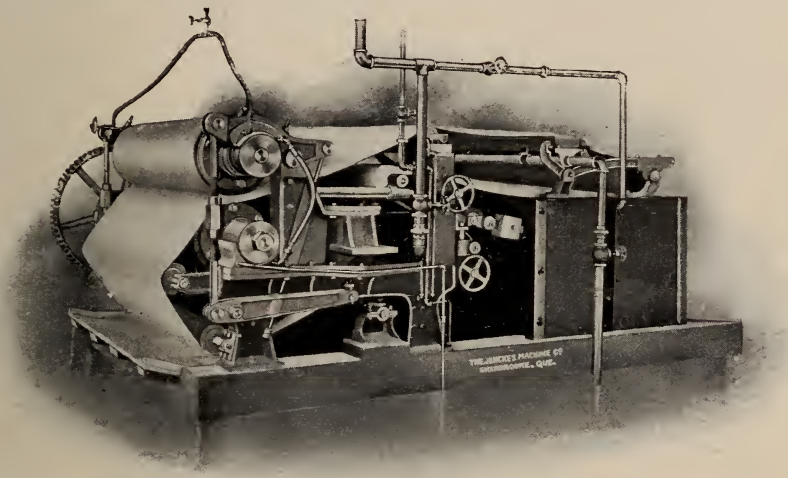


Fig. 33—Wet Machine—Jenckes Machine Co.

quickly across under the sheets. When the lower end is grasped and the roll allowed to complete its revolution, the sheet falls on the table in front of the machine, where it is folded and sent to the hydraulic presses. The guide rolls are made of wood on which a certain thickness of cloth is nailed in a spiral form and by means of a conveniently placed hand wheel can be moved by the attendant to one side or the other, thus keeping the travelling felt in a proper direction. The beater N is made of four arms attached to a revolving shaft and together with water from the perforated pipe P, cleans the felt from all impurities. The press rolls, S and T, are of cast iron, and are pressed together by screws; they squeeze the water out of the felt before it takes a fresh load of pulp from the cylinder B. The frame of the machine is of ordinary cast iron. The capacity of an ordinary grey Canadian felt, 72 inches wide, is an average of five tons dry per 24 hours, with a speed of about 50 ft. per minute; when new, it will carry more than when partly worn out. These felts last from four to eight weeks, according to the treatment they receive.

If resinous balsam is used, the capacity of the machine is much lowered, as the resultant clogging of the cylinder produces an irregular layer which the gummed felt will not pick up entirely. The cleaning is done as in the case of the screens by steam and coal oil.

HANDLING AND PRESSING.

The sheet of pulp from the press roll, usually ⅛ to 1-10 of an inch in thickness, is folded on the wet machine table so that there are no edges showing on the outside and ends, the final sheet being about 24 by 16 inches in size when a 72-in. wet machine is employed. This pulp contains about 65 per cent. or so of water, depending on the use or disuse of a suction-box and on the

pressure between the press rolls. As the cost of shipping such a combination of 65 per cent. of water and 35 per cent. of pulp would be uneconomical, and in most cases prohibited, the percentage of water is reduced by means of hydraulic presses.

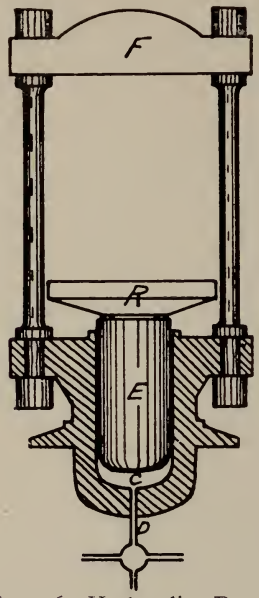


Fig. 36—Hydraulic Press.

After being folded the sheets are put on a truck specially constructed for that purpose and between each one or two folded sheets such material as old felt or wire netting is inserted; the object of this is to facilitate the removal of the water when pressure is applied. Some mills use wire netting only, but if this is ungalvanized the pulp is liable to become spotted with rust, which much depreciates its value. Felt only will not serve the purpose quite as well as a combination of both felt and wire netting, in which case a piece of felt is inserted between each sheet and a piece of wire netting between two pieces of felt every three or four sheets. When the truck is loaded it is rolled to the presses.

This truck is constructed with such a distance between the wheels that when the ram or platen of the press rises it is borne up with its load of pulp, which is pressed without any injury to the truck, thus dispensing with unloading it. Figure 36 illustrates the principle of a hydraulic press very commonly used. The truck is driven over ram R, and water pressure is admitted in cylinder C through the opening and pipe D on piston E; the pulp sheets are pressed between ram R and top F by an amount depending on pressure admitted at D and on the size of piston E in cylinder C. The whole press is of very heavy construction, the lower frame of cast iron having a brass-lined cylinder, the piston and rod being made of steel, while the top piece and the platen are of cast iron; the top piece is supported and kept in place by means of four heavy steel rods, with screw and nuts at both ends. (See figure 42.) The pressure used is from 1,500 to 5,000 lbs. per square inch, and is supplied by triplex pressure pumps of usual design. In order to move the platen of the press more rapidly up before it starts to press and down after pressing, the cylinder is usually connected to a low pressure pump, or the discharge from the bottom of the cylinder may be let into the air, allowing the platen to force the water out by its own weight. The percentage of water in the pulp after pressing is usually 50 per cent. This varies sometimes from 45 to 55 per cent., depending on the pressure applied and on the felting between the sheets, but not to any practical extent on whether a suction-box and very high pressure between press rolls have been

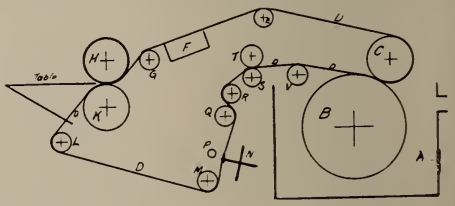


Fig. 37—Sectional Elevation of Wet Machine.

used in the wet machine. The object of the pressure is to get that percentage of water as low as possible, and their practical limit is reached when the pulp con-

tains about 45 per cent. of water. To reduce this percentage other methods with heat as an agency must be employed; these will be considered later.

BALING.

After being pressed the pulp has to be baled into bundles suitable for shipment. From the presses the trucks are rolled to scales, where a sufficient number of sheets are weighed to form a standard uniform weight of dry or wet pulp. This standard weight or amount of pulp is then removed to a press. This consists of cast iron top and bottom, held together by four steel rods. The pressing is accomplished by means of two knees spread out or drawn in by a screw and sprocket wheel driven by a chain, and the driving is so arranged that when a certain pressure is applied the driving pulley falls out of gear and

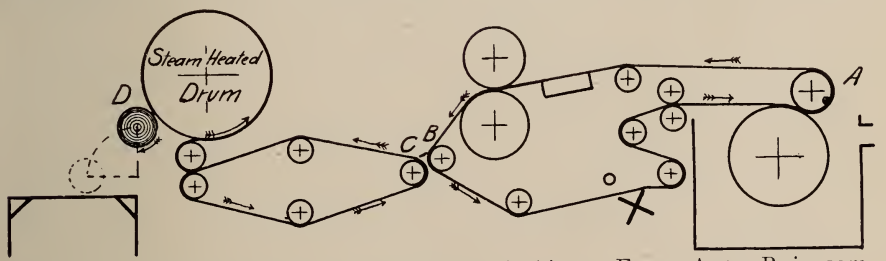


Fig. 38—Sectional Elevation of Dry Pulp Machine. From A to B is same as ordinary Wet Machine. From C to D is the Drying Part.

automatically stops pressing. When the pulp is placed in this press, two or three layers are laid under and on top of it, and while subjected to pressure the whole is tied by means of four or five wires inserted in grooves at the top of the bottom casting and at the bottom of the follower. Pressure is then relieved, and the bale is ready for shipment.

Sometimes a wrapper is used, but it is often found more expensive than the loss of pulp occurring without. If there is a chemical pulp mill in connection, a sheet made by this process will be tough, and answer the purpose very well, and at a small cost.

TESTS.

There are two kinds of tests, for quality and for percentage of water. For testing the quality of the pulp at the mills the following methods are largely used. A glance at the sheet from the wet machine with a strong magnifying glass will tell the maker whether the pulp is too coarse or too short. Again, as the sheet, ⅛ or 1-10 of an inch thick, issues from the wet machine or from the hydraulic press a piece may be torn off and folded twice; if no cracks or splits appear after this operation the pulp is considered good. Again, a thin sheet when held to the light should not exhibit too large splinters or chips. There are many other such simple tests that may be made, and are employed by different manufacturers. The tests for determining the quantity of water in the pulp are performed by taking samples through different parts of the bales and weighing them immediately, and then again after they have been dried by heat. The difference in weight gives the percentage of water in the pulp. This is a very delicate operation, one which requires skill and judgment. The percentage of water in a bale differs at various parts throughout the bale, being, immediately after pressing, greater at the edges than in the centre. The percentage also varies constantly from the time the bale is pressed until it is used at the paper mill, due to the drying up of the sides. The weight also changes from loss of pulp in manipulation and handling. These variations, which are the cause of constant disagreements between purchaser and seller, have originated a movement at present towards

standardizing methods of testing. The most satisfactory method of determining a weight agreeable to both purchaser and seller is for both parties to determine the percentage of water in the bales when it is most uniform, i.e., just as it issues from hydraulic press.

YIELD.

As mentioned before, this mechanical process transforms into pulp practically all the solid substances of the wood except the bark, the only loss occurring in the splinters that pass through unground or which are too large to pass through the screen holes. A cord of green spruce weighing 4,400 lbs. will weigh about 3,700 lbs. after being barked. This will produce on the average 1,900 lbs., or 51 per cent. of the weight of the green wood, the remaining 49 per cent. being water in the wood and the waste occurring through the process. Such a cord of wood treated by the soda or sulphite process would yield from 100 to 1,300 lbs. of dry pulp.

(To be continued.)

DRY WEIGHT OF PULP.

Moist pulp is frequently packed and sent out in the form of rolls, which are handy to transport and afford good protection from dirt, etc. When sheeting the pulp, it is easy for the pulp maker to take samples at stated times over the whole width of the machine, and so obtain a fair average for the unavoidable fluctuations of the dry weight both across and lengthwise of the web. When this is conscientiously done, the weight of the dry contents calculated on the weight of the moisture found during manufacture and the air-dry weight can always be taken as being thoroughly reliable. When the roll is packed it begins to give up moisture to the packing material, and at the same time a continual loss in weight begins to take place, due to evaporation. According to the weather and temperature considerable losses in weight, which may lead to unpleasant differences, often show themselves in a few days. The following remarks may perhaps serve to show how a satisfactory method of sampling and checking may be applied.

In a particular consignment the procedure was as follows: To get an idea as to the effect of the drying, twelve rolls were taken out of a batch and the dry weight carefully determined. The rolls were then packed in the usual way and stored in a closed stock room at wide distances apart so as to expose the whole to like influences. At intervals of one week a roll was cut open longitudinally and from each samples were taken: (1) from the outside, (2) from midway between the outside and the centre, and (3) from the centre. It was found that the drying had proceeded so slowly toward the inner layers of the roll that the dry weight after twelve weeks' storage had only risen inappreciably at the centre, and very little in the middle layers, while the outer layers appeared almost perfectly dry in a few weeks.

The checking of the dry weight by taking samples from the interior of the rolls seems, therefore, a reliable method. Where the pulp has not been stored too long or has not been too long in transit, the purchaser should be satisfied that the loss of weight on the wet weight is really due to the drying of the exterior layers, and should base his calculations of the dry weight on the correct calculation of the wet weight by the manufacturer. If the purchaser is not satisfied that the dry weight can be calculated from the original wet weight on the basis of the percentage contents checked as above described, then two questions arise, viz.: (1) How is the percentage contents of the stuff to be determined so that the dryer portions may be taken into consideration when taking samples? and (2) How is the wet weight existing when the check is made to be ascertained?

If the wet weight still present when the check is made be made the basis on which the dry weight is calculated, then

the demand that an average sample of the various layers of pulp of varying dry weight be taken is eminently justified. Winkler says in his book on sampling paper pulp, page 11, under the heading Taking Samples from Rolls: "Opening rolls of pulp by unrolling is not a good method; it is better to proceed as follows: After the packing material has been removed, the roll should be cut into right through the layers with a sharp knife, and strips 6 to 9 centimetres wide taken from the upper and middle and lower parts of the roll, the major portion being taken from the upper and middle parts." Apart from the fact that "lower" must obviously be more correctly "inner," the exact amount, how much more or less, that shall be taken from the outer or inner parts of the roll is left very much to the caprice of the individual.

A concrete example will perhaps make the point clearer. A roll of pulp rolled on a stick 6 centimetres in diameter will be 19 centimetres in circumference at its innermost layer, at a diameter of 20 centimetres, the circumference will be 63 centimetres, and an external diameter of 40 centimetres will give a circumference af 125 centimetres. It is clear, therefore, that the number of sample strips of equal widths to be taken from the various parts of the roll must be proportional to the circumference of the corresponding layers. If, therefore, in the above example, two strips are taken from the interior of the roll, six to seven must be taken from the middle layer and 13 from the outermost layers, in order to obtain a comprehensive average. Such a method, however, is not one which can be carried out in practice. If strips of equal width be cut from all the layers after cutting open the roll, the outermost and dried parts would not be adequately represented proportionally to the amount of material contained in them, and this method of sampling therefore is also unsatisfactory.

The correct method is to cut a wedge out of the roll. The breadths of the sample strips are thus always proportional to the circumferences of the several layers of pulp. This method is, however, difficult, but the following one is both correct and easy, and is carried out as follows: A roll is cut open, and from the sheets so formed, and which, of course, decrease in size toward the interior of the roll, a certain number (from 6 to 10), are taken in their entirety at regular intervals from the outside toward the interior, and used for the estimation of the dry weight. When the samples become too heavy, the sheets may be divided into two or three parts, the sheets being cut parallel to the axis of the roll. The sheets are, however, best kept whole, as inaccuracies are liable to occur if they are divided. It is, therefore, obvious that each layer of pulp contributes a sample proportional to its magnitude or the calculation of the dry weight. In taking samples by this method the dryest and the dampest layers, i.e., the first, should not be rejected. This is as it should be if the dry weight is to be calculated on the wet weight taken at the time of checking. The rolls from which the samples are taken must be selected from different parts of the stock so as to obtain a fair average to compensate for the irregularities due to differences of storage. By the old method 2 per cent. to 5 per cent. where the general condition of the rolls was uniform, was held to be enough.—Papier Zeitung.

ENAMELED PULP BOARD FOR TILING.

Up to the present time, tiling for the finishing of bathrooms, fireplaces, etc., has been something of a rich man's luxury, as it is not cheap enough to be used promiscuously in an ordinary dwelling house, where wainscoting is made to take its place very largely. Wainscoting can now be replaced by something which can hardly be told from the high-priced tiling used in fine residences. This is enamelled pulp board, made up of a composition which takes an

enamel finish of any desired color, and can be stamped, and rolled into slabs of any size, with the grooves depressed at frequent intervals to imitate tiles of various sizes and shapes. In these grooves a filling of plaster-like material is inserted, the enamelled surface of the pulp board being perforated in the grooves to enable the plaster to penetrate the enamel and adhere to the underlying pulp. The board is not only cheaper to manufacture than the small tiles, but is much more convenient to handle. The enamelled finish makes it impervious to water, and it can also be made fireproof by special treatment with chemicals, which is a necessity when the imitation tiling is to be used in connection with the fireplace. The pulp board is originally built up of a plurality of thin paper boards, cemented together, being finally compressed and enamelled on one surface, while the back is provided with staples by which the boards can be fastened in position.

WATERPROOF COATING FOR DESIGNS.

L. Lebateux has patented a process whereby paper is coated or treated, either entirely or in places, so as to form an ornamental design, and preferably by means of a printing press, with a mixture formed by grinding the lighter parts of zinc white, known as "snow white," with linseed oil, in the proportions of about 750 grams of zinc white to 250 grams of oil. The linseed oil may be replaced by any other suitable fatty base, such as the media having linseed oil as a base employed in printing. The paper so coated is waterproof, is suitable for printing on or for writing on in ordinary or copying inks from which press copies may be obtained. When the composition is applied in the form of a design, the latter is invisible until it has been developed by rubbing with a metal, such as a gold or silver coin, etc., when it presents the appearance of having been drawn with a graphite pencil. Images or designs of greater or less intensity may be obtained by adding a greater or less proportional amount of zinc white to the mixture, and rubbing with the metal to a greater or less extent. The invention is specially applicable in the manufacture of bank cheques, share certificates, post cards, etc.

NEW ZEALAND-CANADA PAPER TRADE.

In the course of his last report from New Zealand, J. S. Larke, Canadian Trade Commissioner, says:

In Auckland a large commission house wrote to eight Canadian paper mills soliciting their agency. One reply was favourable, the other seven stated they were selling all they could make at home at better prices than could be got in New Zealand. In Wellington a firm had received but three replies to forty-two letters written to manufacturers of various lines, in only one of which was there a promise of trade. In Christchurch a firm in a large way in boots and shoes, leather and leather goods had received but five replies to over fifty letters. In the latter case the names had been taken from the advertisements in a trade journal and many of the advertisers were not in a position to do an export trade. It would be advantageous to Canada that even in such cases the applicants had returned a courteous answer to the letters stating that they could not entertain the proposition, but had passed the letter to a firm which they thought might be able to do so.

There is no direct connection between Canada and New Zealand. The three principal routes by which Canadian goods reach New Zealand are the overland via Vancouver and Sydney, and via Liverpool or via New York. Very great interest was taken in the question of freight and mail facilities at the meetings in the Chambers of Commerce and elsewhere, and it was felt that there must be an improvement in the means now available. The quickest and most direct route between New Zealand, America

and Europe is via San Francisco. The Union Steamship Company of New Zealand was engaged in this service, but since the annexation of the Hawaiian Islands to the United States, it has been driven off this route by the coasting laws of the United States, and this has diminished the popularity of the route in New Zealand. The Union Company is now a partner in the Vancouver service, and negotiations are now going on between the government of New Zealand and the Canadian Australian Steamship Company looking to an arrangement whereby the steamers of the company would call at a New Zealand port. This would render it necessary to abandon Brisbane, but it is represented that the government of Queensland will make no objection to the change. It the arrangement is made it will much help trade between Canada and New Zealand, but it will not solve the whole problem.

The Canadian Pacific Railway and Canadian-Australian steamers are now offering very low rates of freight, in some cases, perhaps, below cost, to encourage business, but even if it could carry average goods at twenty-five dollars per ton it would be impossible to compete with a rate of less than six dollars per ton on the ocean route between New York and New Zealand. In sailing vessels still lower rates are offered. Certain sorts of newspaper are sold at thirty dollars per ton. A difference of even a dollar per ton freight in such a case will determine business or no business. It is impossible for such classes of goods to be shipped by the overland route.

The New York and Liverpool routes are open to Canadian goods and the great bulk of the exports do come by these ways. But against the former are urged charges of delay, high charges in New York and against the latter the damage done to goods by the transfer from one ship to another. Inquiries were, therefore, constantly made as to whether there was not a possibility of a quicker and cheaper route from Eastern Canada direct.

As the whole question hinges on the quantity of freight, it may be interesting to note that the Australian consumption of printing paper is estimated at over thirty thousand tons and that of plaster of Paris at over three thousand tons per annum, both of which should come from Canada. These two items alone form a good beginning for a monthly cargo from Canada.

AN EARLY PAPER MILL.

In the Upper Canada Gazette, of June 3rd, 1826, there appeared, under the heading of "Upper Canada Paper Mill," the following notice: "The subscribers have in view the erection of a paper mill at this place, to be in operation in the course of the month of May ensuing, solicits the patronage of the public in supplying rags sufficient to keep the same in employment, for which he will give as high a price as is usually given by the paper-makers in the adjacent parts of the United States, and means will be taken to send for the same, when a quantity is collected at any one point in any part of the province, which will be paid for either in money or paper, as may best suit the proprietor. The advantages to this colony from the establishment of a paper mill are so obvious and so numerous that the subscriber hopes that persons to whom the value of rags may be no object will from patriotic motives lend their assistance in securing a domestic supply; otherwise, one great object in establishing such a manufacture, namely, that of keeping the money among the colonists, will be defeated."

The notice was signed by James Crooks and was dated West Flamboro, 20th March, 1826. This mill appears to have been the second mill started in Upper Canada, the first having been established at the village of Ancaster, in 1820, the third in order apparently being the Don Valley Mills (still in existence), which opened a few weeks later than the West Flamboro mill.

A CASE OF SPOLIATION.

A case which affects the character of the Government of Quebec, and affects also the security of capital and property rights, has been ventilated in the Provincial Parliament and press. It arises out of a dispute between the Chicoutimi Pulp Co. and Wm. Price, lumber merchant, of Quebec. A history of the case is given by Mr. Price in a letter to the Quebec Chronicle, of which the following is the substance:

The town of Chicoutimi introduced a bill at the present session of the Quebec Legislature, amending its charter in which was contained a clause dealing with the ownership of lands reserved for streets and squares at the time that the town was originally laid out by the Government.

When the bill came before the Private Bills Committee of the Legislative Assembly, the Chicoutimi Pulp Company obtained an amendment excepting from the operation of the bill certain lands, and declaring them to be their property. The text of the amendment proposed by the Chicoutimi Pulp Company and carried in the Legislative Assembly, was as follows:

"Nevertheless, the right of property in the town does not extend to any part of Montcalm street upon which the wharves of the Chicoutimi Pulp Company are now built, nor to the lands bordering such street to the west, which lands had been reserved upon the original plans of the division of the village of Chicoutimi for a street, and upon which the said wharves are also built; nor to the lands which may have been reserved upon the said plans, for streets, which are now numbered 935, 910, 909, 882, 1,130, 1,148, 1,149, 1,161, and also that part of lots number 932 and 1,162, bordering on the river Chicoutimi, of the official plan and book of reference of the town of Chicoutimi, and which have been sold to the Chicoutimi Pulp Company or its predecessors by the Government of the Province of Quebec; and all the said lands are declared to have been and to be the property of the Chicoutimi Pulp Company."

Now a portion of the lands described in this paragraph never have been and is not now the property of the Chicoutimi Pulp Company, but is my property.

Mr. Price states that when the bill came before the Private Bill Committee, he produced his titles to the property and so far satisfied the committee that he had a case that the Attorney-General amended the clause to make it read in the last part as follows: "and it is hereby declared that the town of Chicoutimi has no right of ownership in the said lands, notwithstanding any reserve that may have been made in any deed or any law with regard to the same and that any rights which the town may have had to the ownership of said lands belong to the Chicoutimi Pulp Company."

Mr. Price then proceeds:

The Chicoutimi Pulp Company were not pleased with this amendment; nothing but a declaratory act would satisfy them and on the third reading of the bill notice to restore the clause as passed by the Legislative Assembly was given by the Hon. Nemese Garneau, President of the Company. I had, of course, no opportunity of being heard before the House and the following gentlemen voted to take my property and give it to the Chicoutimi Pulp Company:—Hon. Messrs. Audet, Berthiaume, Bryson, Cormier, N. Garneau, Girouard, LaRue, Lanctot, Mathieu, Methot, Rolland, Sylvestre and DeVarennes. Of these gentlemen, the Hon. N. Garneau and the Hon. V. W. LaRue are Directors of the Chicoutimi Pulp Company. Those who voted against this act of spoliation were Hon. Messrs. Archambault, Chapais, Gilman, Sharples, Turner and Ward.

The intention of the promoters was to obtain a legislative title to property which the Chicoutimi Pulp Company pretended to own but its title to which was manifestly so insufficient that it was afraid to submit it to the test of a legal decision.

While the value of the land at issue

may not be very great, the principle involved in legislation of this character is of supreme importance to the public; not alone to those persons whose property the Chicoutimi Pulp Company may covet, but to all people whose property may be coveted by others having sufficient influence to obtain legislation of this kind.

I am advised that though the intention of the promoters is clear, it is doubtful whether the object has been attained, and I propose forthwith to test the question and if necessary carry it to the Privy Council; should I find that my property really has been transferred to the Chicoutimi Pulp Company, I shall come back to Legislature and ask that body to undo the injustice done and return the property stolen.

I suggest for the consideration of the public whether legislation of this character is not calculated to prove injurious to Canadian enterprises seeking capital on the English or foreign money markets. If companies can promote and carry legislation transferring to them other people's property, they can also promote and carry legislation by which creditors will be deprived of their security, or, if desired, of their recourse against their debtors. WM. PRICE.

QUEBEC PULPWOOD ASSOCIATION.

The Quebec Pulpwood Association held its first annual banquet, at Sherbrooke, on June 2nd. A large number of men interested in the industry were present from all over the province, including the Hon. H. M Price, Quebec, president of the association; E. W. Tobin, M.P.; B. A. Dugal, manager, Bank Nationale; F. N. McCrea, B. C. Howard, D. O. E. Denault, E. C. Gatien, L. S. Channell. L. A. Belanger, E. Laguiux, J. S. Tetreault, A. Gendron, J. A. Precourt, Sherbrooke; John Champoux, D'Israeli; D. H. Pennington, St. Julie; G. C. Poulin, St. Jean; O. C. Wilson, Lewiston, Me.; L. Bolduc and N. I. Turgeon, St. Francis; G. P. Nadeau, Stanfold; B. Quinn, Windsor Mills. Mr. Price, in responding to the toast of the association, explained that its aims were to promote pulpwood interests in the province of Quebec, by showing shippers that it was for their own interests to ship only the best pulpwood, by seeing that all contracts were observed, and by seeing that they got the necessary railway facilities. He then proceeded to advocate an export duty on pulpwood. Canada, he said, supplied the United States with 400,000 cords out of its annual consumption of 2,000,000 cords. An export duty would cause all this to be manufactured in Canada.

E. W. Tobin, M.P. for Richmond and Wolfe, said that what the pulpwood business really needed was more capital. He did not believe in an export duty on pulpwood, as it would affect the farmers and settlers.

Mayor Camirand, J. H. Walsh, general passenger agent of the I.C.R., and Messrs. Farrell and McKinnon, of the Eastern Townships Bank, responded to the toast of Our Guests.

NEW IDEAS IN PAPER MAKING.

There are a lot of brand new ideas in the paper field in these days, says the Paper Mill, and lots of people are experimenting with new materials out of which they hope to make paper. Some of the experts of the Agricultural Department, at Washington, have been working over cotton stalks, and think they can make good paper from them; and they are also experimenting with various kinds of wood other than spruce and poplar, in the hope of finding a new pulpwood. Out in California the wise men of the State Agricultural Department are promoting the growth of some Japanese plants, out of which paper is made in the Flowery Kingdom. On the other side of the Continent, in St. John, N.B., Mr. Cushing, who has had considerable experience in the manufacturing of sulphite pulp, has succeeded in making pulp of merchantable quality out of spruce bark, as noted last month in

the Pulp and Paper Magazine. Again, up in Minnesota, H. P. Stanchfield, president of the Minnesota Syrups, Oils and Vinegar Company, of Minneapolis, proposes to make syrup, vinegar and salad oil out of pumpkins, and to use the pulp residue for the manufacturing of paper. Possibly some of these ideas will work out successfully; certainly some of them will not, and it is pretty certain that the experimenters with pumpkins will not discover the substitute for spruce, by means of which we shall be able to perpetuate our forests.

USES OF PAPER AMONG THE JAPANESE.

Japanese oiled papers, made from the barks of trees or shrubs, are astonishingly cheap and durable, according to a writer in The National Geographic Magazine. As a cover for his load of tea when a rainstorm overtakes him, the Japanese farmer spreads over it a tough, pliable cover of oiled paper, which is almost as impervious as tarpaulin and as light as gossamer. He has doubtless carried this cover for years, neatly packed away somewhere about his cart. The rikisha coolies in the large cities wear rain mantles of this oiled paper, which cost less than eighteen cents and last for a year or more with constant use. But perhaps the most remarkable of all the papers which find a common use in the Japanese household are the leather papers of which tobacco pouches and pipe cases are made. They are almost as tough as French kid, so translucent that one can nearly see through them, and as pliable and soft as calfskin. The material of which they are made is as thick as cardboard but as flexible as kid.

GATHERING WASTE PAPER.

The Paper Mill says an ordinance proposed by Commissioner of Works Ward, of Buffalo, in regard to the collection of waste paper, and the requirement of householders that they have it ready for the city teams, arranged in packages, has aroused a storm of indignation among those whose custom it is to profit by gathering this waste product of a great city. This is especially true of the Salvation Army, and some facts made public by Lieut.-Col. W. A. McIntyre, commander of the Buffalo branch of the Army, make interesting reading. Col. McIntyre said: "The financial returns from this business are enormous. There are many men who have made fortunes from paying for waste paper and then selling it to wholesalers and mills. If the Salvation Army of this city had the privilege of collecting all waste paper gratis I would promise the Mayor to relieve the city of all her unemployed and to provide our employees with satisfactory wages. During the month of March the local army derived an income of $290.47 from the collection of waste paper alone, and it must be remembered that, comparatively speaking, we have only a few homes from which we are allowed to get the waste paper. As for the use of the proceeds, we support every man with them who is willing to work."

—C. L. Benedict, of Perth, and Arthur Van Koughnet, of Toronto, says an exchange, have recently concluded a contract for the manufacture and sale of their patent combined letter-envelopes for the United States, with the General Manifold Company, of Franklin, Pa., whose New York office is in the Standard Oil Building. Mr. Benedict is the inventor of the "5 in 1" stationery, and was until recently in the service of the Bank of Montreal. Three or four years ago he formed a partnership with Arthur Van Koughnet, insurance broker, of Toronto, who has conducted the manufacturing in Toronto, and has successfully introduced this invention in different parts of the Dominion. The "5 in 1," besides other features, is a time and labor-saving system, and has been adopted by many of the banks, financial institutions and merchants. The Canadian business will be carried on as usual from Toronto.

NEWS PAPERS AND CHEAP PRINTINGS.

Possible Improvements in their Manufacture.

Written for the Pulp and Paper Magazine by R. W. Sindall,, F.C.S., London, Eng.

In selecting this subject for an essay on the manufacture of paper, or paper pulp, we are guided by the desire to indicate one or two directions in which there are large possibilities for the improvement of news papers and cheap printings.

It is not our intention to give any details of special improvements which have been made during the past few years, or to draw the attention of paper makers to any new inventions. We believe that suggestions as to new developments in these directions will be of greater value than any account of specific modifications except in so far as these may illustrate the principles which we propose to describe.

We also select this subject in particular because the manufacture of this class of paper forms a very large and important feature in the industry generally.

One of the most important subjects which should receive the attention of papermakers is the question of drying paper on the machine. This operation affects the paper in many ways, and we are confident that the close study of the subject from its several points of aspect will well repay attention.

We may first refer to the question of output. The increase in output has been obtained by the increase in speed of the machine. Where 250 feet per minute was once regarded as a satisfactory result, papermakers are now dissatisfied with anything less than 400 feet per minute.

This increase of speed has altered the conditions under which the paper has been dried very materially. It has thrown upon the drying cylinders a very much greater proportion of work in the shape of evaporation. This extra work has been effected in the majority of cases by simply increasing the temperature inside the cylinders.

What has been the result of this increase? Generally speaking, it has resulted in the manufacture of paper containing a very low percentage of what we may call natural moisture. The papermaker has been using pulp containing an allowance of 10 per cent. of atmospheric moisture, but under the conditions obtaining with ordinary fast running machines, the hot, dry paper seldom shows more than 5 to 6 per cent. of moisture, and while we do not overlook the fact that ordinary paper under normal conditions will rarely contain 10 per cent. of moisture, yet at the same time, if we assume that the raw material is to be credited with 10 per cent. of moisture we should similarly turn out a paper containing 10 per cent. of moisture.

Also, as to the conditions which bring about such a serious loss in output we shall have something to say later on. For the present we may confine our attention to this important question of output.

It is very clear that if a papermaker buys pulp containing 10 per cent. of moisture, and sells paper containing only 5 to 6 per cent., he is suffering a substantial loss.

The following table, one out of many experiments made by the writer, gives an example which is often found in actual practice.

TABLE 1.

Percentage of moisture in paper when reeled dry, direct from the calenders.

Six tests on one reel:

	3.9 per cent.
	4.0 "
	4.4 "
	4.0 "
	3.8 "
	5.3 "
Mean...	4.0 "

On a basis of this kind it is easy to calculate the exact loss of revenue.

Some papermakers who have clearly

realized the loss due to this defect have attempted to compensate themselves to some extent by storing the reeled paper in a cool place, thereby endeavoring to allow the paper sufficient time to reach its normal state by the absorption of moisture from the air, but under the most favorable conditions it can easily be shown that such storage is in reality an impossible factor in this question. The writer made a very large number of observations in order to arrive at some definite conclusions concerning the absorption of moisture from the air by the prolonged exposure of reeled news paper.

The reel of paper referred to in Table 1 was placed by itself in a cool storehouse, where the conditions were most favorable to the absorption of moisture. When first exposed this reel weighed 596 lbs. (258 kilos). After a lapse of 30 weeks the reel weighed 587 lbs (267 kilos).

Table No. 2 gives the weight of the reel at various periods during the test.

TABLE 2.

Table showing weight of the reel at different periods:

	Lbs.	or Kilos.
Weight when first exposed	569	258
Weight after 1 week	573	259.8
" " 2 weeks	574	260.27
" " 3 weeks	575	260.72
" " 4 weeks	576	261.17
" " 6 weeks	578	262.08
" " 13 weeks	581	263.45
" " 26 weeks	586	265.72
" " 30 weeks	587	267.17

Percentage moisture at commencement, 4.00.

Percentage moisture after 30 weeks, 6.90.

In this case the percentage of moisture had increased from 4 to nearly 7.

Another experiment made by the writer was with three large reels of ordinary news paper containing at the outset 5 per cent. of natural moisture.

These reels were exposed for three months, the percentage of moisture after the lapse of that period being 6.75.

Table No. 3 gives the periodical increase of weight.

TABLE 3.

Table showing the increase in weight obtained by exposing reeled paper taken direct from machine:

	Lbs.	or Kilos.
Weight of paper when exposed	5,629	2,553.15
Moisture absorbed 1st week	24	10.88
Moisture absorbed 2nd week	23	10.43
Moisture absorbed 3rd week	7	3.17
Moisture absorbed 4th week	8	3.63
Moisture absorbed 5th week	5	2.27
Moisture absorbed 6th week	5	2.27
Moisture absorbed 7th week	4	1.81
Moisture absorbed 8th week	5	2.27
Total weight of reeled paper after 2 mos.' exposure	5,710	2,589.88

	Lbs.
Another month's exposure gave an additional weight of	25
	5,735
Percentage of moisture in reel at commencement	5.00%
Percentage of moisture in reel after two months	6.75%

The weight of paper at the outset was 5,629 lbs. (2,553 kilos), and at the end of two months 5,735 lbs. (2,590 kilos).

This slow absorption of moisture is clearly due to the fact that the moisture must pass from the external sheets to the internal ones by the process of conduction.

If it were possible to expose the paper freely to the influence of the air

a different result might have been obtained, as one can see by observation recorded in Table 4, this having reference to the behavior of single sheets exposed to the air.

TABLE 4.

Table showing increase in weight of a single sheet of paper taken direct from a machine and exposed to the air.

Test No.	Wt. of sheet direct from machine.	Weight after 18 hrs.	Weight after 48 hrs.
1	100	101.8	102.2
2	100	103.0	103.7
3	100	102.0	103.0
4	100	101.3	101.8

The next question which we have to study is that of quality, which term we may use to include the strength, the feel, and the appearance, as also the handle, of the sheet.

Paper possesses these qualities at a maximum when it has been dried slowly to its normal condition. In proportion as the natural wetness, so to speak, of the pulp is retained, so we get a good-looking sheet. In other words, the hydration degree of the cellulose becomes an important factor, and the relation of the natural moisture to the pulp itself an important function of the quality.

Now, an over-dry sheet easily betrays itself. It is brittle, possessing an artificial rattle, and having little toughness or firm handle.

This overdrying is due to the increase in speed and other conditions which have not been modified sufficiently, and these modifications cannot be introduced without material changes, which it is our purpose to indicate.

If the paper is to be made at any speed, and with the production of a minimum quantity of broken, the paper must be dried to a certain degree. With a perfectly even and uniform sheet, both in the matter of composition and thickness, the process of drying would be a perfectly easy matter, but the unevenness is there.

In the first place, it arises from the condition of the pulp. The effect of the wood pulp travelling at such a high speed is to produce a moist web, imperfectly formed by reason of the unequal description of the pulp, which is rendered still more uneven as the speed increases.

Secondly, any unevenness at the line of contact by the couch roll may also have its effect, while press rolls in bad condition are fruitful sources of trouble.

Hence, we find as a result that the moist paper leaving the press rolls is damp in some places more than in others, so that it becomes necessary to dry out the whole sheet to a condition most suited to the damp spots, and we may thus over-dry 95 per cent. of the whole area of paper in order to obtain satisfactory running conditions.

What are the ideal conditions for drying? Clearly the exposure of the paper to a comparatively low temperature for a sufficiently long period. Of course, in news paper we must have a fairly warm cylinder in order to produce a cohesion of the resinous size, but the principle is the same whatever the actual conditions may be.

To evaporate the water from a sheet of paper we may select one of two methods.

We may submit the paper to a high temperature for a short period of time, or to a low temperature for a longer period.

If the sheet is perfectly even, a higher temperature may be applied, because the time of contact can be regulated, but in actual practice a large area of paper is to remain in contact with a high temperature after it has been sufficiently dried on account of the dry spots already referred to. Hence, we find that this over-dry paper loses its water of hydration, but the material point is to give the damp spots time to become sufficiently dry.

Our contention is that a longer time on a drying cylinder at a lower temperature will be less injurious to the paper, because under those conditions

a temperature might be employed which would not drive off any natural moisture, however long the paper might be in contact with the cylinders.

The writer made a large number of experiments with news papers running at comparatively high speeds with a view of determining the effect of drying the paper at lower temperatures.

The result of this observation served to show that the quality of the paper could be materially improved, but the surface was streaky, and the damp spots, although sufficiently dried, showed up in a manner familiar to all papermakers.

This only confirms the contentions laid down, that prolonged contact at reasonable temperatures should remedy defects of this kind, and yet, at the same time, do away with excessive over-drying of the paper as a whole.

We have now to consider how it is possible to introduce a system by means of which the paper can be dried at a comparatively low temperature.

Broadly speaking this can only be effected by a considerable increase in the number of drying cylinders. This principle had already been recognized by the foremost papermakers, for we now find that fast running machines are provided with 24 and 26 cylinders, and sometimes even more, in the place of 16 and 18, so the number of cylinders, or in other words, the area of drying surface has been increased to the extent of 30 per cent.

Yet we find with the speeds, that in all the machines these have increased in a far greater ratio. Instead of 250 feet per minute, we now find 400 feet a common occurrence.

It must be self-evident that the increases are not in the same proportion. Where the drying surface has not been increased in this manner, the effectiveness of the existing plant has been increased simply by the employment of higher temperatures. In many cases the extra work of evaporation has been accomplished by the use of live steam in the cylinders in addition to the exhaust from the engine driving the paper machine.

This increase of temperature has been followed by depreciation in out-put and quality. But this necessity for additional cylinders has made is self-evident, not so much in the maintenance of the quality of the paper in reference to its handle and strength, as to the more important question of evaporation.

Now the number of cylinders, or the area of drying surface depends upon the nature of the paper. If the machine is making a fine paper, the exhaust steam will be more than enough to dry the paper under the existing circumstances. Whereas the change from a thick to a thin paper may necessitate the addition of live steam, but this is simply due to the neglect of the time factor.

In the latter case one would often find a big pressure of 8, 10, and 15 lbs. steam, clearly showing that with a limited number of drying cylinders the temperature of the steam is a more important factor than the total heat in the steam itself.

This brings us to a third question, namely, possibility of considerable economy in the steam used for drying.

Paper makers have already discovered that the amount of steam required for drying a ton of paper is far less in the case of a machine supplied with an ample number of cylinders, i.e., a large area of drying surface.

A machine possessing 24 drying cylinders will consume far less steam per ton of paper than a smaller machine supplied with only 18 cylinders, other things being equal.

The reason for this must be obvious. We are able by reason of longer contact between paper and cylinder to utilize the heat in the steam to a far greater extent.

The steam discharges from the machine at little or no pressure followed by a corresponding economy in the matter of exhaust steam leaving the cylinder.

Continuing this principle still further it is easy to see that by increasing the

drying surface we can give the paper more favorable conditions for drying by reason of the possibility of using a lower temperature and a longer period of contact.

One objection which would possibly be raised as to increasing the number of cylinders is the fact that the cost of driving the cylinders would to some extent nullify the economy.

This objection cannot have very much force under any circumstances, but we see no difficulty in arranging matters so that the additional cylinders could be constructed so as to allow their being used, or cut out of use by suitable arrangements of gearing.

But such a course, while it might save the steam required for driving them, would prevent the full use of the benefits to be derived from drying the paper at a lower temperature.

(To be continued.)

CROWN LANDS ADMINISTRATION.

Its Effect on the Pulp and Paper Industry of Quebec.

The manner in which the Crown lands of Quebec are administered is strikingly illustrated in the evidence taken by the Colonization Commission at Hull. The story of the Maclaren case is told by the Gazette as follows: The Maclaren Company has extensive limits in the Ottawa district. A few years ago the company decided to erect a pulp and paper mill at Buckingham. Mr. Vallillee, the manager of the company, went to Quebec and saw Mr. Parent, telling him what it was proposed to do. On the assurance that the company would be protected in its raw materials the company erected a pulp mill at a cost of $325,000. Before beginning the erection of the paper mill the company discovered to its astonishment that large areas had been taken out of the limits for which it had paid and turned over to a department at Quebec, known as the Works and Colonization Department. The result of this transfer was to open this area for colonization and to deprive the Maclaren Company of the assurance of its raw material supply. It was not long before the company found out that it was at the mercy of unscrupulous men. The provincial regulations provide that before giving out location tickets land agents are obliged to take a declaration from the intending settler that he is not purchasing the lot merely for the purpose of cutting the timber, and to give notice every month to the holders of timber licenses of all sales of land included in their limits. It was on April 2, 1901, that a portion of the Maclaren limits in the township of Montminy were opened to settlement. On April 15th, at the instance of C. B. Major, who represents Ottawa county in the Legislature, F. A. Christin, Crown Lands agent, issued location tickets to several parties for lots in these limits. Christin, it is said, neglected, as his duties provide, to secure the declaration of a bona fide settler, and also to inform the Maclaren Company of the sale of these lots, so that the company went ahead and cut timber upon them. Not only this, but through the delay the company lost its right of protesting against the issue of these tickets. As a result of the Maclaren Company cutting timber on these lots claims for damages were presented against it for a large amount, nearly $2,000. Suit was entered, and the company determined to settle with those parties whom it found were in good faith, and who had actually suffered loss. It was then that the company made the interesting discovery that some of these parties did not exist, and apparently never had existed. The company endeavored to secure the cancellation of the location tickets, but Mr. Major objected. In March, 1903, a new party appeared on the scene. He was Noe Landry, a game warden, in the employ of the Province. He produced transfers of the rights and claims of the parties named on the tickets to himself. Mr. Major became active on his behalf. An attempt was made to induce Mr. Parent to force the company to pay damages to Landry, and when the company declined to do this, he (Mr. Major), on behalf of Landry, pressed for the payment of disbursements alleged to have been made by the original

ticket holders, amounting to about $700. This was after the Government had cancelled the claims. Previously, Mr. Vallillee, the manager of the company, had, according to his evidence, been approached by Mr. Major with the proposition that the company should advance the money to clear off the land, and make the improvements necessary to obtain the patent, the company to be reimbursed by the timber, which it would secure free of provincial dues. This offer was refused, as Mr. Vallillee was convinced that the timber already belonged to the company. Matters were in this stage when the commission met at Hull, in February last, and the company set out to prove that an attempt had been made to illegally deprive it of its rights. The evidence presented was clear. It was so clear that finally, when Landry was asked questions regarding the identity of the original ticket holders, and their transfer to him of their claims he declined to answer on the ground that by so doing he might incriminate himself. He failed to appear at the last sitting, but made a declaration before the Crown Lands officer at Hull, in which he admitted that there had been irregularities in securing the location tickets for the lots in question, but that they had not been committed for his own benefit, but for that of certain people in Ottawa county, and that he had been merely the instrument of others. Mr. Major, when these facts had been established, made a declaration, setting forth that he had always acted in good faith, believing that the parties really existed, and only as a lawyer in behalf of his clients. There the matter now rests.

As a result the Province has been deprived of an important industry. Mr. Vallillee swore that it was the intention of the company, had it been guaranteed the possession of the limits, to build a paper mill at a cost of $750,000, equip it with a working capital of $250,000, and furnish employment to about 1,200 men.

J. A. Moore, of the Moore Investment Co., Seattle, has taken an interest in the proposed pulp mill at the north end of Vancouver Island.

Mill Matters

The Canada Paper Co.'s St. Francis mill had a narrow escape from being burned in May, some sawdust, provided for fuel, having taken fire accidentally.

On account of the break-down of an electrical motor, No. 5 mill of the E. B. Eddy Co., at Hull, had to shut down for a few days in May. In that mill are three paper machines and six beaters, giving employment to about 75 men.

The Harmsworths, proprietors of the London Daily Mail and other English publications, are said to have made an offer to purchase the pulp mills of the Timber Estates Co., at Millertown, Nfld.

The surveys for the building of the large paper, pulp and flour mills, which are to be erected at Fort Frances, Ont., by the American Power Co., are now being made. W. L. Bowker, superintendent of construction for A. Hood, New York engineering firm, is in charge of the work.

Three hundred men employed at the Glens Falls, N.Y., mill of the International Paper Company, struck June 6th, because of the refusal of the company to reinstate a boss steamfitter, who was discharged in March. The union had been trying to bring about his reinstatement for several weeks, and the strike was precipitated when the company put a new foreman in charge of the repair gang. The union gave the company one hour to reinstate the old employee, and the manager refused.

The Australian correspondent of the Monetary Times mentions in a recent letter that Canadian wall paper is working its way in both that Commonwealth and in New Zealand, although it has not been easy to introduce, owing to the English width being used. One firm in Launceston, one of the smallest of the Australian cities, recently gave a $7,000 order. Watson, Foster & Co., and Colin MacArthur & Co., of Montreal, are both doing business in this line, but the former has the advantage through having a representative, Mr. Fotheringham, on the ground.

At the spring assizes, at North Bay, the case of McCrae vs. Sturgeon Falls Pulp Co., was tried. It was an action for breach of agreement, the plaintiff claiming that he was hired by the company for the season, while the company claimed that he was hired only until the work was completed. Judgment was reserved.

The employees of the Royal Paper Mills, some three hundred in number, at East Angus, Que., are on strike. Both the paper mill and the pulp mill are affected. The men demand that they should be paid regularly every two weeks, instead of once a month, as has been the custom, and they also have an alleged grievance against the superintendent of the paper mill.

The convention of the International Brotherhood of Papermakers closed at Niagara Falls, N.Y., May 14th, after electing officers. George Mackey, of Watertown, N.Y., was elected president; Thomas Mellor, Watertown, N.Y., secretary, and J. T. Carey, of Palmer, N.Y., treasurer. George Bishop, of Grand Mere, Que., was elected fifth vice-president. The convention placed itself on record as in favor of a nine-hour day for the day workers and an eight-hour shift for the towermen. No demand was made on the manufacturers for a specific date for the change of hours to take effect.

Commenting upon the closing down of the pulp mill, at Mispec, N.B., referred to in our April number, the St. John Sun says that there appears to be no reason why the mill should close at the present time, as the price of the finished product of the mills is higher than it ever has been in the history of pulp making in St. John. Logs for making the pulp can now be obtained for between $4 and $5 per thousand feet. It requires 1,400 feet to make a ton of pulp, which is now bringing $5 and $6 more than it has done in many years, making $10 or $11 per ton as profits. The demand is unusually strong, and conditions in Canada during the past year have been most favorable towards the industry, while the United States markets are good and profits can be obtained without trouble for every pound of pulp that can be manufactured. When the mill closed it had only on hand thirty tons, or about one day's output, unsold.

D. H. Ross, Canadian commercial agent, at Melbourne, Australia, reports that samples of pulp forwarded from Canada have not been found suitable for local requirements, which call for sulphite in bleached and unbleached sheets. If suitable dry pulp can be produced by Canadian makers, it is probable that the authorities will waive the present customs regulations, which require the sheets to be perforated in order to allow the goods to land duty free.

Harrison Watson, of the Imperial Institute, has forwarded to the Department of Agriculture, at Ottawa, a small sample of casein, a by-product of milk used in England by papermakers and manufacturers of certain kinds of paints. Most of the supply at present comes from South America. The casein is worth from £28 to £30 per ton, c.i.f., London, Liverpool and other ports. Another sample is quoted £35, ex-wharf, Liverpool, and other quotations vary from £40 to £50, depending on the quality.

Work in connection with the pulp and paper mills of the Oriental Pulp and Paper Company, at Swanson Bay, B.C., referred to in our April number, is progressing. The location is on the mainland opposite Princess Royal Island. There is a never failing source of water supply, furnishing 15,000-h.p., from Yule lake. This has been tested at all times of the year and that amount of power is the minimum. The timber to be used will be cut in the vicinity. J. M. Mackinnon is the local representative of the Canadian Finance Syndicate, of London, of which the Oriental Pulp and Paper Company is a subsidiary organization, and he states that $100,000 has already been expended. A wharf has been built, and of the 83,000 acres of timber the company has in sight, leases have been secured for 61,000. The initial capacity of the paper mill will be 50 tons of news print a day and this may be doubled at

any time. The company is bound, under its concession, to be turning out news by 1906.

The following were among the enquiries relating to Canadian trade received at the Canadian Government Office in London: A New Brunswick firm desires to correspond with large manufacturers in Great Britain of note and letter paper, tablets or pads of writing paper, envelopes, boxes of stationery containing envelopes and paper, etc. A merchant and agent (who contemplates visiting the Dominion shortly) is looking out for the representation in Great Britain of Canadian shippers in various lines, such as wood pulp, cordage, oil cake, drugs and chemicals, as well as machinery suited for the printing and allied trades. A Parisian house is looking out for agencies for Canadian firms desiring to open up an export business with France. An agent at Porto, Portugal, is desirous of establishing relations with Canadian shippers with a view to taking up their representation.

At Hawkesbury recently, Joseph Breault, an employee of the Riordon Paper Company, was sentenced to forty days' hard labor in jail, on a charge of malicious destruction of a log carrier at the company's pulp mill. The complaint was laid by the superintendent, R. S. Hall, who, with a number of the mill employees, gave evidence against Breault, the chief witness being Philion Sauve, a foreman. In his evidence, Sauve stated that the log carrier had frequently got out of order without any apparent reason. Being suspicious that the trouble was not accidental, he concealed himself one night near the carrier. Shortly afterward Breault came along, and taking a piece of wood, pried the carrier chain off the cogs, and the machinery was stopped.

Among the companies recently incorporated is the Gibson Lumber Company, with a capital of $200,000, headquarters at Winnipeg, to deal in timber limits, lumber, etc., to manufacture and sell lumber, pulp and wood materials. The charter members are: Robert William Gibson, financial agent; James Andrew Johnston, lumberman, both of Winnipeg; Edwin Ashley Banbury, lumberman; Robert Samuel Banbury, lumberman, both of Wolseley, N.W.T.; George Henry Davis, barrister-at-law, of Winnipeg.

It is stated that the libel suit of the E. B. Eddy Company against the leaders of the Hull Lodge of the International Brotherhood of Paper Makers, and of the Ottawa Trades and Labor Council, will go on. The action is for $50,000, and is taken on account of alleged libelous statements in a circular published by the defendants during the strike of the paper-makers of the Eddy Company. The latter sent Mr. Eddy a resolution, in which they declared the strike at an end, and expressed the hope that all differences between Mr. Eddy and his former employees would be at an end. Mr. Eddy, however, has not changed his position in the matter, and the case is likely to come up in the Hull Superior Court in September.

A new complication regarding the Sturgeon Falls pulp and paper concession developed in the Senate Railway Committee a few days ago. When the bill respecting the Temagami Railway was taken up, Mr. Royce, who appeared for the promoters, stated that the Imperial Paper Mills, Limited, had purchased the interest of Father Paradis and L. O. Armstrong, of Montreal, for $100 each. Father Paradis admitted that he had made an absolute assignment, but claimed that the deed was invalid, because it was made on Sunday. He was the first projector of the railway, which was intended as a colonization, and not as a business, road. He claimed that the whole purchase was a swindling transaction, that his name should not be removed from the directorate without his leave, and that the assignment of his interest was obtained by fraud. Hon. Mr. Bolduc urged that Father Paradis be given a chance of proving his allegations, and the bill stood over.

The case of Glasgow vs. the Toronto Paper Manufacturing Co. is before the Court of Appeal, the defendants having appealed from the judgment of Judge Boyd, entered on the findings of the jury in favor of plaintiff for $8,000 damages and costs at the second trial at Cornwall. The action was to recover damages for injuries sustained by plaintiff in defendant's mill while employed in cutting and trimming paper with a paper cutting machine running by motive power. The machine was supposed, if in proper condition, when the knife ascends, to lock itself automatically, and no further operation of the machine can be made until the operator sets it in motion. The plaintiff alleged that because of the improper condition of the machine, which was known to defendants, the knife did not lock, and his right hand was cut off and some fingers of the other hand. The appeal has been heard, and judgment reserved. A. B. Aylesworth, K.C., and G. I. Gogo, of Cornwall, are for the plaintiff, and Cassels, Cassels & Brock for defendants.

The Cornwall Standard and Cornwall Freeholder report progress on the new mills of the Cornwall Paper Manufacturing Co. at Mille Roches, near Cornwall, Ont. A considerable part of the roof is in place, and the main building will soon be ready for its machinery. The dimensions of the buildings are as follows: Machine room and finishing room, 180 x 80 ft.; beater-room and bleach-room, 180 x 63 ft.; boiler house, 46 x 40 ft. These are all connected. In the rear is a large store house for materials, etc., 105 x 30 ft. The chimney, for which the concrete foundation is now ready, will be 98 feet high. There will be a water tank for fire protection, 75 ft, high, and having a capacity of 40,000 gallons. The machine, which will be placed as soon as the building is completed, is one of the most modern construction. It is made by Bentley & Jackson, Bury, Eng., and combines all the latest European and American ideas, being especially adapted to the requirements of the Canadian paper trade. It is very large, making a sheet 120 inches wide, with a capacity of 10 to 15 tons of fine book, writing or envelope per day. All the machinery will be on the ground floor. There will be two high-speed engines, and the boilers will be equipped with a patent underfeed stoker. The buildings have been made large enough to admit of the installation of a second paper machine, and the entire equipment has been planned with this in view, so that the capacity of the mill may be doubled at any time by putting in a second machine and erecting a wing to be used as a finishing room. A siding from the Grand Trunk runs alongside the machine-room. The new mill will employ 50 to 60 hands when in full operation. The managing director is S. Greenwood, general manager of the Canadian Colored Cotton Co.'s Cornwall mill, and Joseph Squire is superintendent.

MINERAL AND ORGANIC COLORS ON PAPER.

Paper fibres, being nearly exclusively of vegetable origin, show much less affinity towards coloring matters than do the animal fibres, wool and silk. On account of the minute state of division of the fibres in the pulp, colors are, however, generally speaking, much more readily taken up than is the case in the dyeing of the same fibres in the form of yarn or cloth.

The affinity of the various fibres toward coloring matters differs considerably, a factor to be taken into consideration in the manufacture of colored paper, which consists of a mixture of various kinds of fibres. To secure a level appearance of the surface of papers of this description, mineral loading materials of mechanical wood pulp are added, the contrast of shade being thus considerably reduced. The coloring matters used in the dyeing of paper pulp may be conveniently divided into two groups, namely, the substantive and the adjective colors. The former dye fibres direct, that is without the application of a mordant,

while when the latter are used a previous mordanting of the fibres is necessary to ensure fixation. The mordants most commonly used in paper dyeing are alum and aluminum sulphate. Their application is very simple, and they possess a remarkable affinity towards many coloring matters. Iron salts, such as ferrous sulphate, nitrate of iron, and acetate of iron, are used in the dyeing of grays, blacks and other dark shades and in the manufacture of Prussian blue, a color very much in demand for paper dyeing. Tannic acid is a very valuable mordant; with iron mordants it produces useful grays, which may be conveniently used as a bottom for other colors. Tannic acid, employed either by itself or neutralized, or precipitated with tartar emetic, is the best fixing agent for the basic aniline colors, such as magenta, methylene blue, etc.

The principal coloring matters, which are used in the dyeing of paper pulp, may now be briefly reviewed, classifying them for this purpose into inorganic and organic colors. Of the former class, the natural mineral colors, also called earth colors, are still very extensively used on account of their cheapness and their property of acting both as coloring and loading materials. The various brands of iron ochre, the oxide red, caput mortuum, umber, sepia, green earth, mineral black, China clay, and pearl hardening, are among the principal representatives of this class.

The artificial mineral colors may either be prepared outside the beater and then added to the pulp, or the precipitation of some of these colors may be actually effected in the beater. Whenever convenient, preference should be given to the latter method, the precipitation of the color, as well as the fixing, being partly accomplished in the fibres. Some of the most important paper colors belong to this group, the principal representatives of which are—iron, buff, manganese, bronze, chrome yellow, and orange, Prussian blue, ultramarine and smalts.

The other group of colors with which we have to deal are the organic colors. They may be subdivided into natural organic colors, that is colors of vegetable and animal origin, and artificial coloring matters, usually called coal-tar colors. Many of the colors belonging to the former group have been superseded by the artificial products, which are more easily applied, and which may be obtained in a more concentrated form. Of the natural organic colors, annatto, turmeric, safflower, red wood, cochineal, weld, and others are now, practically speaking, of historical interest only. Among such colors as are still extensively used are logwood, and in combination with it, fustic extract, for cheap blacks and grays, also catechu or cutch for fast browns or as a bottom or a mordant for dyeing heavy shades with aniline colors. The artificial organic coloring matters now at the disposal of the paper maker are very numerous. Their characteristics are brilliancy and purity of shade, strength, easy application and solubility in water. Fastness to light and air is, however, with few exceptions, not their strong point. Of the yellows and oranges we have auramine, metanil yellow, naphthol yellow, orange II, and chrysoidine; of the browns, Bismarck brown and vesuvine; of the blues, water blue, Victoria blue, and methylene blue; of the reds, the eosines, rhodamines, palatine scarlet, saffranine and magenta; of the violets, methyl violet and crystal violet; of the greens, brilliant green and malachite green; and of the grays, the nigrosines.—Julius Hubner, in the Paper Maker.

Some changes are contemplated in the forestry branch of the Crown Lands Department for Ontario. Judson H. Clark, M.A., B.Sc.A., Ph.D., of Cornell University, who is a native of Prince Edward Island, and at present connected with the Bureau of Forestry, at Washington, has been appointed to the branch, but the scope of his work and the changes which will result will not be decided until Mr. Clark reaches Toronto on August 1st.

PULP AND PAPER MARKETS.

Almost without exception the Canadian paper mills have been busy during the past month, many of them being unable to fill their orders. Prices are fairly well maintained, but there appears to be no disposition to take advantage of the keen demand for paper now prevailing in every branch of the trade.

Regarding trade across the border the Paper Trade Journal says: "While the demand has eased off with the dealers the mill situation continues strong. No weakening in the quotations of any of the various grades of paper has as yet been discovered. This strength of prices is remarkable, in view of the fact that the dull season is at hand. The strike in the Wisconsin paper mills, if it is long continued, must certainly still further stiffen the market. The large consumption of paper for the forthcoming Presidential campaign is counted on to offset in part the annual midsummer dullness.

The pulp market is quiet. Mechanical wood pulp is quoted in New York at $14 to $16, f.o.b. at pulp mill. Owing to the strike in the Wisconsin paper mills there appears to be an effort to bear the market, but it has not yet succeeded. The Paper Mill reports as follows on the sulphite market: The domestic article is strong. The price continues at 2 cents at the mill. We quote: Domestic bleached sulphite, 2.75 to 3c.; unbleached, 1.85 to 2⅛c.; foreign bleached sulphite, 3⅛ to 3⅜c. (delivered New York and Boston); unbleached, 2 to 2.30c.; domestic soda fibre, 2¼ to 2.35c.

PAPER STOCK MARKET.

Montreal, June 18th.

There is still a fair demand from Canadian mills for paper stock in nearly all lines that they use. The demand has slackened, however, from the United

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States for the grades usually shipped there, particularly the better grades of waste paper and new cotton cuttings. The continued high water in all the rivers north of the St. Lawrence is giving the mills ample power, and they are all quite busy.

Considerable quantities of roofing stock have arrived in Montreal from Great Britain during the last fortnight, otherwise the supply would have been short.

Mixed cottons and blues and thirds are still selling at about $1.25 to $1.35, and there are as yet no accumulations.

Manilla rope continues steady. Bagging still unsaleable.

Common waste paper is in active demand, and is likely to continue so for the next month.

Domestic white rags	$2.00 to	$2.10	per 100
Mixed bagging	55 to	65	"
Blues and thirds.....	1.25 to	1.35	"
Dark cottons	75 to	90	"
Roofing paper stock..	50 to	55	"
Waste papers	35 to	45	"
Hard white shavings.	2.00 to	2.10	"
Soft white shavings..	1.00 to	1.50	"
Book stock	75 to	90	"
Manilla rope	1.75 to	2.00	"
Sisal and jute string	75 to	1.00	"

SCANDINAVIAN MARKETS.

The Farmand of May 28th reports: "Mechanical is neglected, and as the consumption is undoubtedly very large, there is only one explanation, viz., that the production is more than sufficient to meet the requirement of the market. The winter in Norway has been unusually favorable for running the mills, and most mills have of late years introduced improvements. The current prices for chemical pulp, although much improved since the beginning of 1903, do not leave a profit of more than about 10 per cent. per annum on the cost of the best situated mills, after setting aside sufficient funds for deterioration of plant. And as to mechanical wood pulp, if the Nor-

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wegian mills obtain kr. 35 to 36 net f.o.b. per ton for good ordinary moist pulp, they only earn on an average perhaps 10 per cent. per annum on the capital invested in the mill, if so much. Buyers ought to bear these facts in mind when judging the market, as a growing demand will not be liberally met unless prices should go considerably beyond kr. 145 net f.o.b. for 'easy bleaching,' kr. 132-135 for 'strong' sulphite, and kr. 35 to 36 f.o.b. per ton for ordinary brand of moist mechanical pulp."

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BRITISH PULP MARKET.

The World's Paper Trade Review quotes the London market for mechanical wood pulp as follows: Sulphite, bleached, £11 10s. to £12; unbleached, first quality, £9 to £9 5s.; second quality, £8 to £8 5s.; soda, first quality, £7 15s. to £8; second £7 5s. to £7 10s.

UNITED STATES CHEMICAL MARKET.

China clay, dull, domestic ranging from $8.50 to $10, and foreign, $11 and up. Alkali is in good demand. Sales of high test for next fire and for delivery over next year are reported at 72½ to 77½ for light and at 80c. for dense f.o.b. works. Caustic soda is firm. Business in domestic is reported on the basis of $1.75 to $1.80 f.o.b. works. June-July shipments of brimstone are held at $22.25 to $22.50.

BRITISH CHEMICAL MARKET.

Paper and Pulp, London, reports:

Bleaching powder, 35/37%, f.o.r. works	£4	5	0
Caustic soda, 77%, f.o.r. Liverpool	10	10	0
Caustic soda, 74%, f.o.r. Liverpool	10	5	0
Caustic soda, 70%, f.o.r. Liverpool	9	12	6
Caustic soda, 60%, f.o.r. Liverpool	8	12	0
Caustic soda, 60% cream, Liverpool	8	10	0
Caustic soda ash, 48%, f.o.r. works	5	5	0
Carb. soda ash, 48%, f.o.r. works	5	10	0
Alkali soda ash, 52%, f.o.r. works	6	5	0
Soda crystals, f.o.r. works	3	0	0
Sodium hyposulphite, f.o.r. works	5	10	0
Alum, loose lump, f.o.r. works	5	5	0
Sulphate of alumina, f.o.r.			

works	4	10	0
Aluminoferric, f.o.r. works....	3	2	6
Sulphur (recovered), f.o.r. works	4	15	0
Sulphur (roll brimstone), f.o.r. works	6	15	0
Sulphur (flowers), f.o.r. works.	7	15	0
Sulphur (Sicilian), f.o.r. works.	5	0	0
China clay, in bulk, f.o.b. Cornwall, 11/6 to.....	1	6	0

A CHANCE FOR CANADIAN PAPER MARKETS.

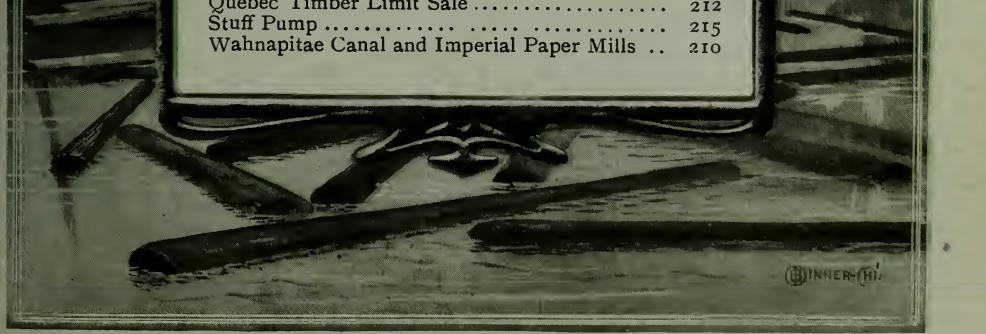
The Supply and Tender Board Office, Adelaide, South Australia, invites tenders for the supply of the following lots of paper, to be delivered to the Education Stores: 200 reams super-calendered fine printing double crown, 30 x 20, 36 lbs.; 200 reams cartridge, double crown, 30 x 20, 55 lbs.; 150 reams cartridge imperial, 30 x 22, 60 lbs., and 600 reams copy book paper, 33 x 20, 42 lbs. Tenders, endorsed "Tender for Paper, Education Department," must be sent in on or before July 26th next. The paper must be packed in cases in the flat, each ream being separately tied up, and be of the specified weight to the ream of 480 sheets, exclusive of string and wrapper; it must also be equal in all respects to the samples to be seen and obtained at the office of the Inspector-General of Schools, Adelaide, South Australia, where forms of tender and any information may also be obtained. Absolute exactness in size will be insisted on. There must be no variation. The whole of each description of the paper is to be manufactured in one lot, and delivery will be required in two shipments; the first shipment of one-half of the quantity of each item is to be delivered within eight months from the date of notice of acceptance of tender, and the second shipment of the remaining half within ten months of such date, under a penalty in each case of 2½ per cent. per month, or part of a month, for delay beyond the specified dates. The successful tenderer will be required, within seven days of date of notice of acceptance, to make a deposit equal to 5 per cent. of the total value of the accepted tender as security for the due fulfilment of the contract.

—Card board is taking the place of cotton fibre in the stiffening of hats and caps in Germany, and imitation linen, made from paper, is being used for lining the inside of trunks, etc.

PULP AND PAPER MAGAZINE

MONTREAL AND TORONTO

Vol. 2. CONTENTS—JULY, 1904. No. 7.



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THE
PULP AND PAPER MAGAZINE
OF CANADA

VOL. 2.—NO. 7. TORONTO, JULY, 1904. $1 A YEAR. SINGLE COPY 10c.

Pulp and Paper Magazine

A monthly magazine devoted to the interests of Canadian pulp and paper manufacturers and the paper trade issued between the 10th and 15th of each month.

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BRITISH INVESTORS AND THE CANADIAN PULP INDUSTRY.

From those in a position to know, we learn that just now it is harder than ever to interest English and Scottish investors in pulp propositions in the Dominion. In the first place money is tight at present. Consols are low, and investors who have money in the funds will not remove it to put into any new thing. Bankers and financial agents are not very partial to Canada as a field for investment in any case. They will buy the country's first-class municipal bonds, guaranteed railway bonds, and the debentures of the solidest loan corporations, but they are shy of the mining and industrial opportunities that are constantly being presented to them. They have never been greatly attracted by Canada's forest wealth. Most of the money invested in this line is from Canadian and American capitalists. The British investors' shyness of the Canadian pulp industry has been greatly increased by the experience of the Scotch and English capitalists who ventured money in New Brunswick projects. British confidence in pulp making enterprises in this country has been freshly shaken by the reports of the British company which owns the Mispec mill. They appear to have an idea that investments in such industries here are bound to turn out disappointing. Ontario fares little better in the opinion of British investors. The manager of one of the great English paper factories is ready to tell anyone that Ontario does not contain a thousand tons of pulp or an honest man.

It is not to the British capitalist or paper-maker that Canada must look for development of her pulp industry, but to the British consumer. Some of the great dailies of London use about forty tons of paper per day, and soon they will have to build their own paper mills. The present supply comes largely from Scandinavia, but it will not last

forever. There is no provision being made in Norway or Sweden to conserve the forests, and already pulpwood is being brought hundreds of miles down the coast to the pulp mills.

It may be a matter of only two or three years or it may be longer, but sooner or later the paper consumers must establish their own sources of supply. Some are making preparations now. For three years the Harmsworths have been looking for a site. Their men have been through Canada, Newfoundland and Scandinavia, but no arrangements have yet been made; and we learn on good authority that their mill is still just as likely to be placed in Ontario as anywhere else.

Pulp & Paper Currency

The papyrus plant, from the name of which we derive our word "paper," and which is the oldest and most durable vegetable paper material, appears to grow in only one place in Europe, and that is along the Anapo river in Italy. An Italian journal does well to urge £31,550 in 1903; wall papers increased from £12,843 to £22,924, and boards from £1,159 to £3,855. Other classes fell off slightly. Within the past few years many British paper makers have set to work seriously to improve their machinery and methods, and this is now beginning to tell.

Most people associate combines and mergers with increased prices, but a syndicate called the San Rafael Paper Co., which has acquired the four paper mills of the city of Mexico, and is after the others in that republic, announces that its papers will be cheaper than at present, by reason of new machinery and more economical management.

that its Government offer a prize for the solution of the question why it only grows in this one place, and that meanwhile the plant should be protected and used for the manufacture of Italian bank notes.

"Shadower" in the Paper Maker says: "Captain Partington once predicted that we should live to see cellulose woven into clothes, and his dream is likely to be fulfilled." Are "Shadower" and the "Capting" not aware that cellulose has been woven into cloth since 1885, and that in 1889 cloths from cellulose were exhibited at the Paris Exhibition? Also, that socks and other garments of wood pulp paper have been "made in Germany" for some years? The latter have been seen on the market in Toronto for three or four years, and we have a cellulose silk factory in operation at Toronto Junction.

It appears after all that British paper makers are more than holding their own, relatively, with those of the United States. Statistics of the last five years, from 1899 to 1903, show that the total imports of United States papers into Great Britain have decreased from 592,501 cwts., valued at £405,905, in 1899, to 497,775 cwts., valued at £359,897, in 1903. The classes of paper in which this decrease has occurred are unprinted papers, strawboards and millboards, coated papers remaining about stationary, while wood pulp boards alone show an increase—from 41,052 cwts., valued at £20,032, in 1889, to 66,912 cwts., valued at £33,767, in 1903. On the other hand, the United States imported of British made papers £54,132 in 1889, while in 1903 the imports were £83,573. In this total writings, printings and envelopes by themselves rose from £13,114 in 1889 to

Flax Pulp, Ltd., the company formed in London with a branch in the United States to utilize flax fibre for paper making, does not appear to have yet got its products on the market on a commercial scale. There is a factory at Niagara Falls, N.Y., for making paper from flax, but it is very secretive as to what it has accomplished.

A Mexican journal announces that Hilario Cuevas, planter of Jalisco, has made an experiment during the last five years, aided by government, in growing a cotton tree which he found in the woods on his estate. It is alleged that this tree can furnish cotton equal in quality to that of the Texas cotton plant, but with a longer fibre; that growth of the tree is very rapid, the production of each tree from the fourth year being 300 or 400 pounds. This year M. Cuevas had a crop of several hundred bales—8 to 12 per acre. The tree is not subject to any of the diseases which often destroy crops; yield is greater, as also sale moisture, consequently irrigation is not price. Moreover, it only needs ordinary necessary, and it can be grown on land where the cotton plant would be out of the question. The government has distributed 10,000,000 seeds of the Jalisco tree among planters in the country. A contemporary suggests that this cotton would be available for paper, but we doubt it. If, as is probable, it is the same as the Kapok tree of Ceylon and India, then its only use would be for upholstery purposes and as an adulterant for cotton. It is very fine and silky in appearance, but the fibre is very weak. Samples of Kapok were sent to the Colonial and Indian Exhibition, and one of these was forwarded to the Office of the Canadian Journal of Fabrics where the curious may see it.

Wallpaper has for some years been the subject of considerable friction between England and Germany, and now it appears that a big fight is being waged for the English market. Some time ago nearly all the British wallpaper makers formed a "trust" to keep out foreign goods, by binding down the factors to sell nothing but British papers. The German makers were successfully crowded out or bought out, and the trust, having an almost clear field, began to put up prices. Up to this time, the Germans could not afford to fight the trust, as their papers were not popular in England, differing as they did in style, width and length from the British makes. When the trust raised prices, however, the English market was worth another effort, and German makers adopted English width and length, and added artistic merit to the English style and came over this season to sell at 30 per cent. below trust prices. As the factors cannot handle the foreign goods, the Germans are reaching the factors' customers direct, and a war of cutting prices is expected to follow. This will also affect the smaller English makers who have sprung up independent of the trust. Ernest A. S. Cotterell, of Scott, Cuthbertson & Co., one of the oldest firms in the kingdom, and one which remained independent, says the trust carried on its business as healthily as any of the trust systems in England, but overreached themselves in their competition with the Germans, who have another system of combination, and have been able to deal hard blows at the trust. The German method has been to enroll every manufacturer into an incorporated society, with very heavy fines for infringement of rules. This has left each manufacturer with the ownership of his mill —tied as to prices, but with a free hand

for that competition of excellence which has of late made Germany a serious competitor for the English market. The trust desires protection as a weapon against the Germans, but the independent manufacturers welcome free trade as competition opens their eyes to new methods of manufacture. "If the Germans 'dump,'" says Mr. Cotterell, "we sell German goods until they are tired of making us handsome presents."

In the February number of the Pulp and Paper Magazine, mention was made of the Callender Paper Mfg. Co., in Ireland, who were making paper from peat. We now learn that on June 21st a compulsory winding up order was granted at the petition of Edwin Butterworth & Co., of Manchester. One week later, however, the counsel for the largest creditor applied for a stay in the winding up proceedings, which stay has been granted until August 2nd. It is thought that the Paper Co. will thus have ample time to bring in the extra capital required, all of which is already promised. The mill at Celbridge, on the Liffey, has been visited by Mr. Sindall and other paper experts, who report that the patents and process are of value, and that the mill can be made commercially successful when certain alterations are made and additional machinery provided, for which purpose the extra capital mentioned is needed. The company made a brown glazed paper, but some in the trade claim that the percentage of peat used was small. The company was formed at the beginning of last year, with a capital of £25,000, acquiring the patents of Wm. Callender, relative to peat-fibre paper making, and a process for utilizing waste liquors. The directors are: Mr. Callender, Sir S. Canning, M.I.C.E.; M. Relf, paper agent of London, and Viscount Templeton, of Sevenoaks.

Although South Africa has not as yet a single paper mill, those colonies may develop a paper industry on special lines peculiar to themselves. There are no trees there suited for pulp, the South African timbers being very heavy close-grained woods, not rich in cellulose; but a native grass has been discovered which is said to be a good substitute for esparto. The report says: The long stiff grass, which grows so luxuriantly around Grahamstown has recently been satisfactorily treated by the Culter Mills Paper Co., at Peter Culter, Scotland, and the grass pronounced to be one of very great possibilities. It is similar to the well known "esparto" grass used in manufacturing fine paper. As the grass used in experiments made by the Peter Culter firm is common in South Africa, a very large industry is likely to be created. The matter is favorably regarded by experts, and the enterprise is already being given practical consideration.

After a tour through Canada, investigating the Canadian forests, Prof. Austin Cary, of the Yale School of Forestry, is reported to have thus summed up his opinion of the timber supply of this country: "Contrary to the boast of the Canadians that their country was practically an inexhaustible supply of timber, I find that the extent of the Canadian forests have been over-estimated, and that the growth of timber there, even in the North-West, is nothing like what it has been reported by Canadian authorities. Their forests are very disappointing, both in extent and character of the growth." Inasmuch as there are vast tracts of Canadian forest land that have not yet been explored by any white man, nor even

adequately estimated by the timber surveyor, it is hardly likely that Prof. Cary could alone have travelled over more country in the last few months than the whole fraternity of surveyors have been able to cover in a generation. If Prof. Cary really gave such an opinion—which is doubtful—he is probably talking bluff in some commercial or manufacturing interests in the States. It is likely that the Professor was making a tour in the province of Quebec, and was referring to the merchantable timber and pulpwood within profitable hauling distance under present conditions. If so, we would commend his opinions to the thoughtful consideration of the Quebec Provincial Government, which is so anxious to deforest those parts of the province upon which the rest of the country depends for its rainfall, and its future industrial wealth.

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The Municipal Council of the Township of Springer, in which Sturgeon Falls is situated, estimates at $13,000 the damage done by the Pulp Company's dam.

Among enquiries relating to Canadian trade received at the Canadian Government Office, in London, were the following: A New Brunswick firm desires to correspond with larger manufacturers in Great Britain, of note and letter paper, tablets or pads of writing paper, envelopes, boxes of stationery, containing envelopes and paper, etc. A merchant and agent, who contemplates visiting Canada shortly, is looking out for the representation in Great Britain of Canadian shippers in various lines, among which are wood pulp, also machinery for the printing and allied trades.

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THE OLD PAPER MILL AT ST. ANDREW'S.

With reference to Canada's first paper mill, established at St. Andrew's, Que., in 1803, as already alluded to, we find the following in C. Thomas' history of the county of Argenteuil.

It seems strange to us, who know so well the various stages through which a new settlement passes before it engages in important manufacturing enterprises, that St. Andrew's, in the very outset of her history, should have had a paper mill; yet that such is a fact is shown by "Bouchette's Topography of Canada," as well as the testimony of many still living, who saw the mill in operation. The following account of this manufactory is given by Colin Dewar:

"The paper mill was started by a company of Americans, who obtained a 30 years lease from the Seigneur for the necessary water power; but as James Brown was the owner of the land where they intended to build the mill, it is quite probable he was a partner from the start, as it was always spoken of as "Brown's Paper Mill." The canal was dug to provide water power, and a dam built across the river from the shore on the east side to a point near the foot of the little island, and as a large quantity of timber and lumber would be required in the erection of the paper mill, they first of all built a sawmill at the head of the canal and extending along the river bank, thus giving plenty of room for the piling of the lumber and storing saw logs; and as business increased, the space between the canal and the main road, now occupied by the railway depot, was utilized. The paper mill was built on the site where Alex. Dewar's store now stands, and had sufficient water power to drive the machinery required for doing a large business, and employment was given to many girls and boys, as well as men. One of the foremen for some time was G. A. Hooker (father of the late G. A. Hooker), and who was ably assisted by the late William Zearns.

"These industries continued for several years, and were of great benefit to the village in giving employment to many hands; besides, there was no other sawmill nearer than Lachute; and it was regarded as a public loss, when the business of both mills came suddenly to a

stop in the spring of 1834, by the dam giving way, owing to the high water and ice. During the summer, preparations were made to rebuild it; but as the Seigneur protested against it, and threatened all sorts of litigation if persisted in, it was deemed advisable to suspend operations. After two or three years' cross-firing between them, the trouble ended by the Seigneur's making an offer to Mr. Brown for the purchase of all his property (which was accepted); extending from lot 29 to Lachute Road, and from the Beech Ridge lots to Davis' line, and including both mills and dwellings. Some of the machinery was afterwards used, when the River Rouge sawmill was erected."

JAPANESE PAPER FIBRES.

By Chas. Richards Dodge, in the Paper Trade Journal, N.Y.

The fact that the Department of Agriculture will experiment next year with the Japanese Mitsumata paper plant calls attention to the different plants used for paper making in Japan, as well as to the manifold uses of paper by these people.

It is doubtful, at the outset, should any of these Japanese fibre plants succeed in cultivation in this country, if they will be of material value to American paper manufacture for some time to come, or until a large commercial supply could be regularly depended upon, and even with a supply assured, the success of the introduction must depend upon the cost of producing the raw material as a crop. Jute was introduced by the Department of Agriculture over thirty years ago, widely conducted experiments proving that it would yield large crops of superior fibre, but we continue to buy the India product because we cannot afford to prepare the fibre for market, after the crop has been grown, in competition with the imported fibre at 1 1-3 to 3 cents per pound.

The condition under which paper has been, and is still being, manufactured in Japan are somewhat similar to the conditions which surrounded the household linen industry of the United States at the time when nearly every farmer was a flax grower and his family linen manufacturers. To-day we buy the bulk of our flax in Europe (for twines and threads), and the larger part of our linen is woven in Europe, while we can grow superb flax in many portions of the country if we would.

In the matter of introducing new fibres it is a principle to investigate from the "business end" down to culture, if I may be allowed the expression, rather than the reverse. In other words, to find out practically how and where the new fibre can be employed in manufacture, and if there are manufacturers who can be depended upon to make a regular demand for it. The question of utility, demand and market value having been satisfactorily settled, experiments in cultivation will answer those other questions of adaptability to soil and climate and cost of production. If the cost of production is higher than the purchase price in the foreign market, that is the end of it.

In Japan paper is employed in many manufactures which, in this country and among Europeans generally, are produced from textiles or from leather, such as rain coats, waterproof bags and sacks, tarpaulins and innumerable small articles resembling French kid, such as tobacco pouches and the like. Such manufactures are possible, first, because the Japanese trade in them has been long established, and the people have nothing else—save cheaper makeshifts—but especially because the paper fibres of Japan are textile in character, possessing the qualities of length, fineness, silkiness or softness, with toughness or strength. They are better fibres for general paper manufacture than anything we are using, though the question whether we can afford to use them in these days of wood pulp and cheap raw material is one which others must answer. Paper can be made from anything that is at all fibrous, but the cost

of production always settles the question of utility.

The paper fibres of Japan are tree basts, or the bark of small trees under 7 feet in height and for the most part growing wild. The entire bark of the trunk and branches is employed, the removal sometimes being facilitated by steaming, after which the bark is washed by repeatedly kneading in clean water, dried and again soaked in water and the outer skin scraped off, the scrapings being used for inferior paper. It is then bleached in the sun until sufficiently white, and afterwards boiled in lye to remove gummy matters.

While ten or more species of these small trees are used for paper making in Japan, only three are important commercially. These are the Mitsumata, with which the Agricultural Department proposes to experiment, the Ganpi and the Kudzu or Kozo. The Mitsumata is known to botanists as Edgeworthia gardneri (synonym: E. papyrifera). It is a deciduous shrub with a stem about 7 feet high, branching into three twigs, hence the name Mitsu-mata. It is cultivated in the mountains of many districts, particularly Yamanashi, Tosa, Tattori, Shidzuoka, Shinane, &c., but is rarely found in a wild state. As it requires more or less shade it is always sown between rows of grain. The plants require a year to mature, so that a crop cannot be secured until the second year. The plant is of easy growth, and produces crops ranging from 600 pounds to a ton of the raw product per acre, though the higher yield is very exceptional. From the bark is produced a fine and lustrous bast fibre, which imparts a quality of whiteness to the paper made from it. It lacks strength and toughness, however, and when these qualities are desired, it is mixed with Ganpi, the result being a paper of proper texture and tenacity, with the added qualities of thickness, whiteness and lustre. For the qualities of smoothness and fineness, a mixture with Kodzu is essential. It is thought that the plant will succeed in cultivation in the Southern States, in clay soils, though the soil considered the best in Japan is a gravelly loam such as is found in the paleozoic formations of the highlands.

The Ganpi is a species of Wickstrœmia growing wild everywhere in the country, but particularly in the warmer portions. The provinces famous for its production are Kii, Tosa (in the Island of Sikoku), Wakusa and Idzu. Four other species of the genus are also used to some extent. The Ganpi is a tree 6 to 7 feet high. The fibre is not only very fine, but strong, though it lacks whiteness. It is especially valuable for making thin papers, and is therefore largely used for the manufacture of the copying papers exported from Japan in such large quantities. The paper is known as ganpi-shi. Experiments in cultivation in Japan showed that the yield of raw bark is about 1,000 to 1,500 pounds per acre. A Formosan species of Wickstrœmia recently experimented with gave a very soft paper resembling French tissue.

The Kudzu, or Kozo, is the well known paper mulberry, and is a species of Broussonetia. Two other species of the genus are also employed for paper making, known as the Tsurikago and the Kami Noki, but the paper is inferior to the Kudzu. It grows both wild and cultivated, and is found in China, Japan, Borneo, the islands of the Pacific, etc. The fibre is fine, of good strength and bleaches readily. It is largely used for the manufacture of the common papers of Japan. In some localities the Kudzu paper, twisted into a coarse yarn, is employed in a kind of textile manufacture woven with silk or hemp. The bark, removed in strips and beaten into thin sheets, is the famous Pappa cloth of Hawaii and other islands of the Pacific. In Burma it is used for papier maché. Its manufacture in Formosa is limited, as the paper is chiefly used in the manufacture of lanterns and umbrellas.

Several other plants are used for paper, as two species of Daphne, one of which is known as Sakura-ganpi. The bast fibres of both are fine and strong, and

more nearly resemble those of Mitsumata. The silkworm mulberry tree, Morus alba, is also used for paper, but only to a limited extent.

If there is a place for any of these Japanese fibres in American paper manufacture it would be well for those interested to import a ton or more of the raw bark and give it a practical test.

Commenting upon the above contribution, the Paper Trade Journal says editorially:

It is doubtful if there will result from the Government experiments much that will be of practical service to the United States paper maker. The Japanese fibres referred to are mainly used in hand paper making, and machine work is largely, if not wholly, dependent on fibres other than those to which reference is made. As Mr. Dodge states, the Government has before this tried experiments on similar lines, notably with jute. United States paper makers, however, continued to import their jute stocks from India during such time as those stocks, in form of butts, interested them at all. Now jute butts are almost unused in this country as paper making stock, although bagging, ropes and threads continue to be of service. The business in jute butts, so far as the paper maker is concerned, was killed by the increased use of wood in its various forms. Wood is abundant, is cheap and suits the paper maker's purpose better than any of its predecessors, and any fibre to supplant it must not only be abundant but must be as available and at least as cheap. At present no such fibre is in sight. This experimenting and searching, however, if it result in repeated failures, cannot be devoid of benefit, for out of it all will probably come the discovery of new fibres or of new processes useful to the paper making industry.

It is said that Mr. Biermans, of the Belgo-Canadian Mill, will shortly leave for Brussels to advise extension to a four-machine mill.

INVENTION OF PAPER MACHINES.

The inventor of machinery for paper making was Louis Robert, a clerk in the employment of the Didots, of the Essonnes paper mills, near Paris. In 1798 he completed a small model for a continuous web of paper on an endless wire cloth, to which rotary motion was applied. Continuous length was thus secured, though at first the width was only that of an ordinary piece of tape. A machine soon followed producing a width of twenty-four inches, for which Robert had a patent from the French Government and a reward of 8,000 francs. Messrs. Didot bought this patent and the machines, and in 1801 induced a well known English firm—Fourdrinier—to take it up. Helped by a clever young mechanic, named Donkin, of Dartford paper mills, they so improved the machinery that a Fourdrinier machine is still the practical equipment of every paper making establishment the world over.

—The largest log drive in the history of lumbering in the Winnipeg district has reached that city about the end of June. The drive, which extends up the Red river for forty miles, consists of 300,000 pieces. The stuff was all cut by the Sprague Lumber Company on its Rosseau limits. The drive is the most extensive one ever run at the one time on the Red river. An idea of the velocity of the river can be obtained, when it is stated that the drive covered the distance from the limits to the mill, 160 miles, in two days.

The E. B. Eddy Company, of Hull, has recently built an iron dam, or rather bulkhead, for the regulation of the water in the dam. The work was carried out at a cost of $12.000, and the new bulkhead will replace one built of wood. By means of it the water in the pond above the mill can be maintained at any level desired, no matter what level it is at in the river above.

MECHANICAL WOOD PULP.*

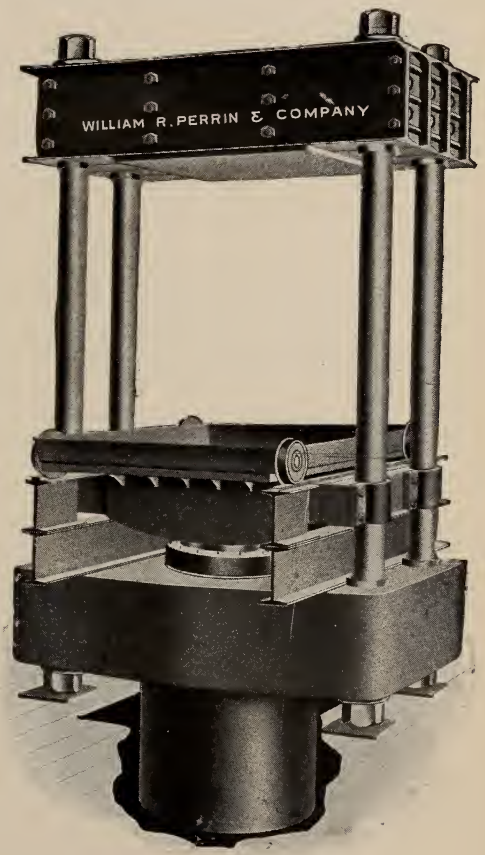
By Stanislas Gagne, B.A.Sc.

(Continued from last issue.)

WET AND DRY PULP.

We have seen that pulp when baled contains from 45 to 55% of water, 50 per cent. being somewhat a standard in most cases. When pulp has to be hauled only a short distance this percentage of water is not a very serious difficulty, as the freight charges are small, and the pulp can be more easily reduced to a solution again, but this is not the case when it has to be carried a long distance. Mills situated near seaports, such as those in Quebec and the Maritime Provinces, can still afford to export 50 per cent. of water with their pulp, but such a plan is ruinous to those situated more inland; hence, with longer railway transportation. This is the reason why some United States paper mills can import their wood sawn and barked instead of moving the pulp mills to the forests and railing their pulp to the paper mills. We have also seen that the percentage of water or pulp is a source of dispute, and that we must use heat to reduce it below 45 per cent. One of the largest mills in Canada has been turning out mechanically-dried pulp with a machine whose principle is illustrated by figure 38. The first part is the same as an ordinary wet machine with felt press rolls, etc., but the pulp, instead of collecting around one of the press rolls is taken up by another felt and carried to a roll and a large drum heated by steam, around which drum the sheet of pulp from the felt is made to pass, and is rolled up on a spindle at the other side ready for shipment. The machine is simple and works economically, but the difficulty is to keep that single drum at such a temperature that it will dry the pulp without burning or scorching it.

To prevent this tendency to scorching in a single drum, machines with several drying drums have been tried without very much success. In a word, we may say that heretofore most of the mechanical methods of drying pulp have not been a success, and that there is much room for improvement. The only method giving perfect results is by means of hot air, to which the pulp sheets are exposed, and this method is not employed in America. Many mills in Scandinavia have adopted it, and



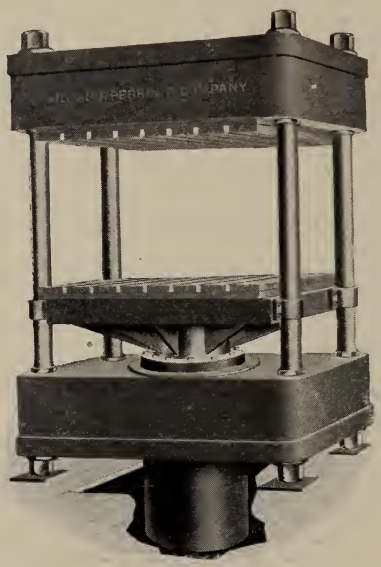
Heavy Duty Press, with working pressure of 450 tons, manufactured by Wm. R. Perrin & Co., Ltd., Toronto.

find profit by so doing. Its principle is this: Pulp sheets are hung on racks and made to pass through a chamber, at one end of which hot air is admitted, and

*The above paper won the first prize given by the publishers of the Pulp and Paper Magazine for the best student's paper presented to the Canadian Society of Civil Engineers for 1903, the judges being members of the Society.

after being exposed for some time to that hot air they come out dried. This is achieved by two processes, the tower and the chamber processes. Figure 39 represents the tower process. The pulp sheets are hung on racks, represented in Figures 40 and 41, until the rack is full, when each end is connected to a long linked chain at A, from whence it goes up B, comes down C, and goes out at D dry. Air is heated at E, goes up C, down B to a fan F, and back to E, where it is reheated. The time required to dry sheets containing 50 per cent of water is about five hours, depending on the temperature of the air and the degree of dryness required.

The chamber process is practically the same; the only difference lies in the fact that the chain carrying the racks moves horizontally instead of vertically.



Baling Press, manufactured by Wm. R. Perrin & Co., Ltd., Toronto.

The only reason (which, indeed, is an important one) why these processes are not used on this continent is the great cost involved in their installation and operation. Not only is a large building of special construction required, but during the process every individual sheet of pulp must be handled several times. Generally, when the pulp is not very well wrapped there is not much advantage in drying it over about 90 per cent., because it will absorb enough water from the atmosphere to reach that percentage when exposed.

HUGHES PROCESS.

The Riviere du Loup Pulp Co., of Fraserville, Que. have substituted in their recently-built pulp mill a new process (called the Hughes Process) for preparing the pulp for shipment. In this process the pulp is ground and screened as in the ordinary way, but from the screen the pulp passes over a simple form of "slush machine," which extracts the greater part of the water, leaving the pulp of about the consistency of porridge. In this form it is pumped directly into the Hughes hydraulic pump machine, which consists of a compression chamber, divided into four spaces by drainer plates covered with wire cloth to which compression chamber a hydraulic cylinder is attached, on which any desired pressure can be exerted. The pulp is admitted to this compression chamber and the pressure is applied which extracts the water through the drainer plates, and the finished product is delivered in the form of sheets 20 in. by 26 in. by ¾ in. thick. The ordinary wet machine and hydraulic press are replaced by the Hughes press, with the result that a thick sheet of pulp, porous and spongy, is produced as compared with a matted or interlaced thin sheet obtained by the ordinary process. The percentage of water in both sheets should be approximately the same if the same pressure has been applied but the former is appreciably more readily reduced to a liquid mass again in the beating machines of a paper mill. The new press, requiring as it does little more power than an ordinary hydraulic press, has this in its favor, that it dispenses with wet machines together with the power necessary to operate them, while the amount of floor space thus occupied is saved. If these presses prove as suc-

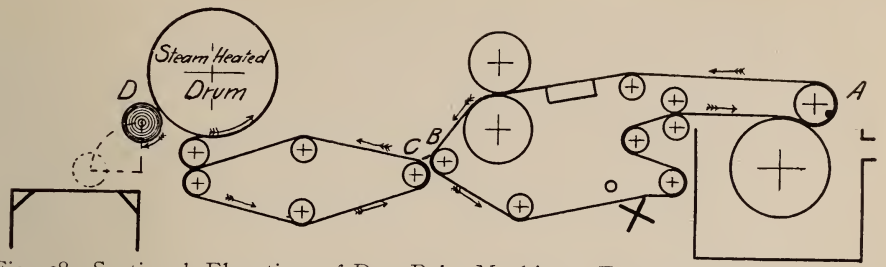


Fig. 38—Sectional Elevation of Dry Pulp Machine. From A to B is same as ordinary Wet Machine. From C to D is the Drying Part.

cessful in their operation as is anticipated, their invention will mark a distinct advance in the pulp industry.

USES OF MECHANICAL WOOD PULP.

The chief use of mechanical wood pulp is, of course, to provide a paper making material. It has many other uses, which yearly increase in number and importance, but at present it may be said to be all practically employed in the making of paper and cardboard. We have now examined these essential properties of pulp the different sources from which it is derived, and the different processes by which it is obtained from wood; we have also seen the difference between a chemical and a me-

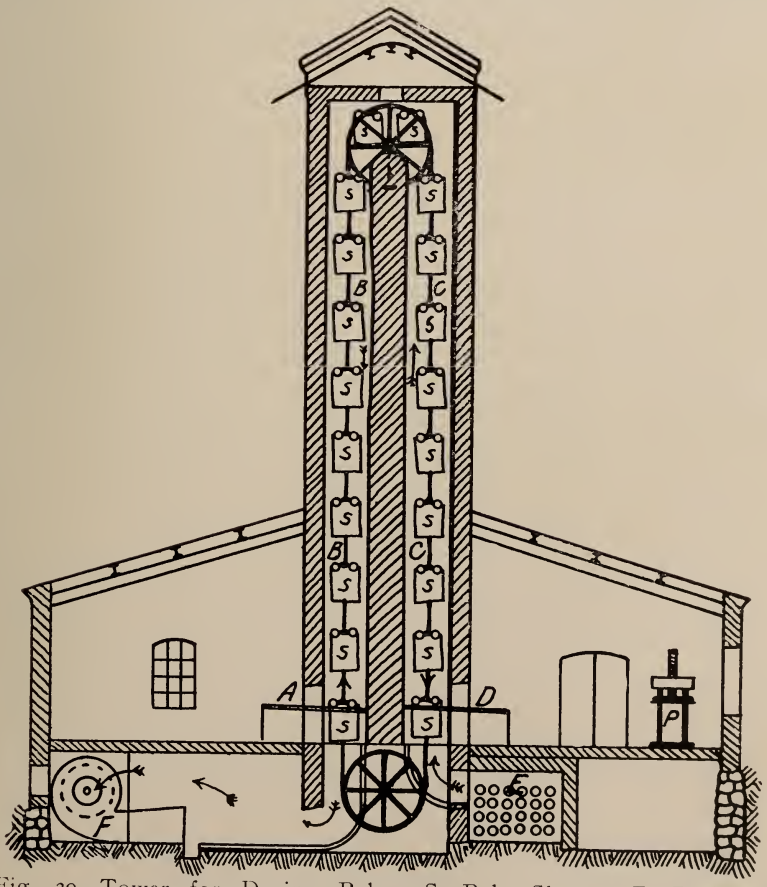


Fig. 39—Tower for Drying Pulp. S—Pulp Sheets. P—Packing Press.

chanical pulp, and why this latter is naturally inferior in quality. This is why mechanical pulp alone does not produce a paper of good consistency; it is for this reason that it goes only as a percentage in the manufacture of paper. Some years ago it was thought that 50 per cent. of mechanical pulp was as much as could be allowed in the cheapest kind of paper, but on account of more improved method of manufacturing both the paper and pulp as much as 85 per cent. and even 90 per cent., of it is used in some of the "news" paper. This is the recognized maximum, while the percentage below that may be anything down to zero, according to the quality of the paper produced. It is also largely used for cardboard and wrapping paper, where its percentage is again greatly varied. Outside of paper and cardboard, wood pulp is now employed in the manufacture of a great number of articles of common use, such as pails, tubs, trunks, cases, barrels, etc. Complete houses, and even car wheels have been made of it.

MANUFACTURE OF PAPER.

To carry out our system of treating this subject, it is necessary to give a short description of the manufacture of paper. When the pulp is brought in bales to the paper mill it is first introduced, together with a proper percentage of other kinds of pulp, with water into a beating machine, where all the particles are separated from each other; from there it is sent to a tank or to a mixer, where the desired amount of loading or sizing material, such as kaolin or talc, is added, and the whole is bleached or colored, as the case may be; this is then diluted with a large amount of water so as to form a very fluid substance. In this state is it admitted to a Fourdrinier machine, where the water containing pulp is allowed to a certain depth on a travelling wire sheet, which retains the pulp and allows the water to pass through. This wire sheet then passes over suction boxes and delivers the pulp to three successive felts, on which it is pressed. From the last felt the sheet, now of a certain consistency, passes around a series of drying drums and cylinder through a calender, which gives the paper a required glaze, and finally the sheet is rolled or cut ready for use.

COST AND VALUE OF MECHANICAL PULP.

The cost of producing a ton of mechanical wood pulp in Canada, assuming the cost of wood to be about $4 per cord, is from $8 to $9, under ordinary circumstances. The great difficulty and what influences the most its value at the mill is its transportation to markets, in our cases, Great Britain and the United States principally. The price paid in Great Britain is sometimes as low as $12 to $15, and as high as $25 to $30 per ton, dry, depending on general rules of supply and demand. In the United States, last year, the price varied from $13 to $25 per ton, dry, delivered. Their import duty is about $1.92 per ton. It is generally considered that mechanical wood pulp at $17 a ton in the United States or Great Britain, could be manufactured with profit in most parts of Eastern Canada.

STATISTICS AND REMARKS.

The Statistical Year Book of Canada shows that during the calendar year, 1902, the wood pulp industry was carried on by 35 mills, 4 of which manufactured soda pulp, 9 sulphite pulp, and 25 mechanical, and 4 make both chemical and mechanical. These mills had an output of 240,989 tons; of this quantity 155,210 tons were mechanical pulp, 76,735 tons sulphite, and 9,044 tons soda; having a total value of $4,383,192. In 1881 the census returns show that there were in Canada 5 pulp mills, with a total output valued at $63,000. This shows that the growth of this industry in the last twenty years has been considerable. The Customs returns for the calendar year, 1902, show that during that year the export of pulp amounted to $2,511,666, leaving $1,871,518, or 43 per cent. for home use. Of this export, Great Britain took $976,172; United

States $1,518,319, and other countries $17,333.

Our export to Great Britain was about 8½ per cent. of her needs, and therefore all our mills could not supply their demand. Owing to the duty on pulp imported into the United States and the facilities afforded them in securing wood for manufacturing pulp in their own mills, the Americans are stripping our forests in the provinces of Quebec, New Brunswick and Nova Scotia. About one-half of the pulpwood used in the United States is derived from Canada, as their home supply is becoming scarce and at the present rate of consumption would be exhausted within a century if they could not import wood from here. It is a well-known fact that

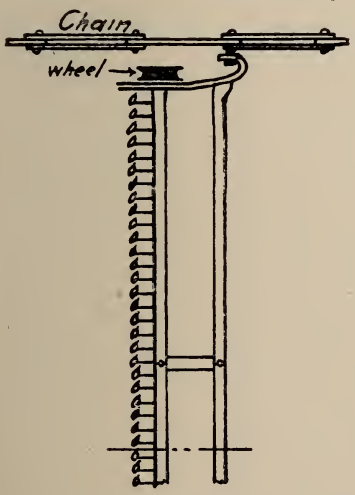


Fig. 40—Sheet Wagon or Frame.

we have the largest pulpwood forests in the world, and this added to our large amount of available water-power, makes a perfect combination as a source of wealth. According to J. C. Langelier, of Quebec, we could supply the world with 1,500,000 tons of pulp annually for 840 years with our present forests. Hitherto this wealth has been little taken care of as little legislation has been passed to prevent its waste, and regulate forest operations; but the Canadian people are becoming alive to the advantages of reforestration and to the necessity of preserving their forests by strict regulations regarding the cutting of the wood. It is to be hoped that in the near future the science of forestry will be applied here with the same

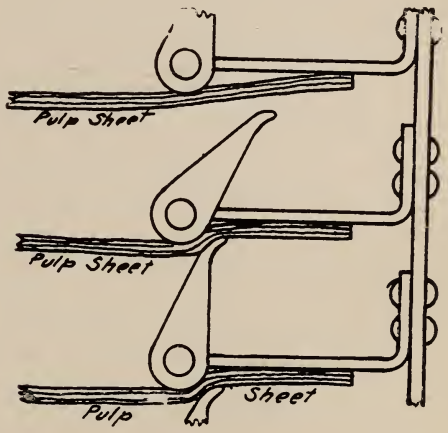


Fig. 41—Clips.

efficacy it has shown in some of the European countries.

We have seen that great pains are taken to dry pulp for shipment, and also that if paper and cardboard were made directly here, we could dispense with wet machines and presses. Both capital and labor will be saved by making paper and cardboard directly at our pulp mills; then Canada will surely become the greatest paper producing country in the world.

For a large amount of information contained in this paper the writer is indebted to the following: a paper on the Process of Manufacturing Mechanical Wood Pulp, read before the Engineering Society of the School of Practical Science, Toronto, in 1898-99, by W. A. Hare, "99," to catalogues and descriptions from the following firms; Jenckes Machine Co., Sherbrooke, Que.; the Waterous Engine Works Co., Brantford, Ont., and Carrier, Laine & Co., Levis, Que., and to different articles published in the Canadian Lumberman, and in the Pulp and Paper Magazine, both of Toronto.

NEWS PAPERS AND CHEAP PRINTINGS.

Possible Improvements in their Manufacture.

Written for the Pulp and Paper Magazine by R. W. Sindall, F.C.S., London, Eng.—Concluded.

The advantages to be obtained by the running of the sheet of paper through the calenders at a lower temperature than is usually found in the fast running machine need not be enumerated.

The improvements which papermakers generally are striving to obtain, being those to which we have already referred are the questions of increase of output, improvement in quality, and economy in working.

We have endeavored to show that the direction in which these improvements may be obtained is to be found in a close study of the conditions under which the important operation of drying is carried out.

We feel that there is considerable room also for improvement in the matter of heating.

When we take into consideration the conditions under which pulp is obtained for the manufacture of newspapers and cheap printings, having special reference to the actual materials which are utilized in the matter of pulp, it is not difficult to suggest what conditions are most likely to secure improvements for the production of a stronger sheet of paper.

Under the existing circumstances, the whole of the raw material is thrown into a beater regardless of its condition. Thus we find in some cases a moist mechanical pulp, which may require comparatively little beating mixed with a hard, dry sulphite pulp, which itself may on the other hand demand prolonged treatment.

On another occasion we may be using a mechanical pulp which has become thoroughly hard and dry to its exposure to air.

Then again we may find a large percentage of broken paper from the machine, being used in the beaters.

Another raw material which is subjected to the same treatment consists of old newspapers, and returned copies of newspapers, which are likewise handled.

This process, therefore, is in reality carried out with an absolute disregard of the possibilities of beating the pulp so as to produce the best results.

In actual practice, therefore, we find that the whole of the raw material in the beater, whatever its nature, has to be treated as of one origin, as though the whole mass was perfectly homogeneous.

Take for example the case of a beater containing sulphite and mechanical pulps in equal proportion.

If the mechanical pulp is of a fair average quality, freshly made and still in its normal moist state, then a comparatively short time in the beater would be sufficient to brush out the fibres.

If the sulphite in the beater is hard, dry pulp, it must be subjected to heavy beating in order to refine the pulp sufficiently to meet the conditions of the manufacture of the class of paper to be made.

Under such conditions, therefore, the mechanical pulp would receive a much severer treatment than is in reality necessary particularly if by reason of limited capacity of beating power, the operation of beating is hastened by letting the roll down hard on the bedplate.

Now in the case of the broken paper from the machine, which may amount to 10 or 12 per cent. of the total output of the machine, we have raw material which in its physical condition and chemical composition differs very materially from the original pulps, mainly on account of reasons which have been fully dealt with in the first part of this essay, e.g., the over-drying of the paper.

This argument applies equally to the old newspapers which are largely used, the state of the latter being considerably aggravated by the presence of the ink upon the surface of the paper.

Our contention is that considerable improvement in the sheet might be obtained by beating this raw material separately.

It is a well-known fact that in the case of a sulphite pulp the quality of the beaten product can be manipulated to almost any required standard by careful attention to the beating.

If the beater contains sulphite pulp which requires careful adjustment of the machinery to bring out all its best qualities, then it stands to reason that the presence of a mechanical pulp may render it impossible for the beater-man to watch the developments of the sulphite pulp.

Similarly if we beat the mechanical pulp separately from the sulphite, the amount of beating required to brush out the fibres can be regulated so as to insure the proper disintegration of the pulp, and thus bring the treatment to a conclusion directly the beating has been carried to its proper extent.

We can see that under the present conditions mechanical pulp can be severely knocked about before the sulphite pulp has been sufficiently beaten.

It may be argued that this course would involve a larger number of beaters, but this is a matter which can only be decided by experimental evidence along the lines suggested.

Probably the mechanical pulp would remain in the beater a shorter time than at present, except of course when it has been allowed to get dry by exposure to air; and the sulphite pulp, beaten for the same length of time as at present, would have a better opportunity of acquiring those properties of strength and handle which hydration produced by intimate contact with the water in the beater under the most favorable conditions, is bound to give.

We believe that paper makers would do well to study the question of beating from this point of view. Any modification of an existing process which thus allows of a finer adjustment and more delicate manipulation is worthy of attention.

It appears to us that amongst some of the advantages which are to be derived from some such modifications as these might be mentioned the production of a closer and more even sheet of paper. The sheet itself would be of more even thickness, and, what is most important, the sheet being made from materials which have been obtained in such a manner as to allow of a more exact control, would be tougher and would give a better handle.

These improvements would in turn have a direct influence upon the question of drying, since the formation of the more even sheet characterized by a greater uniformity in thickness would insure better results in the operation of drying.

Thus the improvements in one direction have their influence upon improvements in another, and we commend these remarks and suggestions to the notice of paper-makers who are concerned in the manufacture of newspaper and cheap printings.

BRITISH PAPER MILLS.

The paper trades directories of Great Britain show that the number of paper machines in Great Britain in 1904, is 414 compared with 417 in 1899, but enquiries show that the productive capacity is greater now than five years ago, because many old machines have been thrown out and replaced by new machines of larger capacity.

English paper mills running in 1904 are given as 211 a decrease of two, compared with those running in 1903. The mills in England appear to be gradually decreasing, as in 1899 there were 225; in 1900 and 1901, 221, and in 1902, 218. The number of firms at the present time is 171, compared with 173 at the commencement of 1903; 179 in 1902; 180 in 1901; 179 in 1900, and 182 in 1899. The number of vats in English mills, which stood in 1899 at 98, increased in 1900 to 107, and in the following year to 109.

The highest number (111) was reached in 1902, dropping to 109 in the years 1903 and 1904. English mills making milled boards only by vat and machine, in 1899, numbered 24, increased to 29 in the following year; to 30 in 1901 and 1902; falling to 29 in 1903 and increasing again to 30 at the present time. The English mills making different sorts of paper are as follows, a comparison being made of the years 1899 and 1904:

	1899.	1904.
Writing papers, hand-made...	17	19
Writing papers, machine-made.	33	35
Writing papers, engine-sized..	31	34
Printings and news.....	70	69
Long elephants	16	15
Cartridges	61	64
Grocery papers	30	27
Small hands	23	23
Browns	92	77
Milled boards	24	31

An examination of the Scotch mills shows no addition to the number of machines. There were 109 in the year 1899, increasing one in 1900 and another in 1901, falling again to 109 in 1902, with an increase of one in 1903 and a drop of one (to 109) in 1904. The number of mills in 1899 was 60, with an addition of one during the four following years, and falling again to 60 for the year 1904. There were 54 firms in 1899 and 55 during 1900-1-2-3. whilst a drop to 54 is again shown for the year 1904. The number of Scotch mills engaged in the production of the following sorts of paper at the present time (1904), compared with 1899, is stated to be:

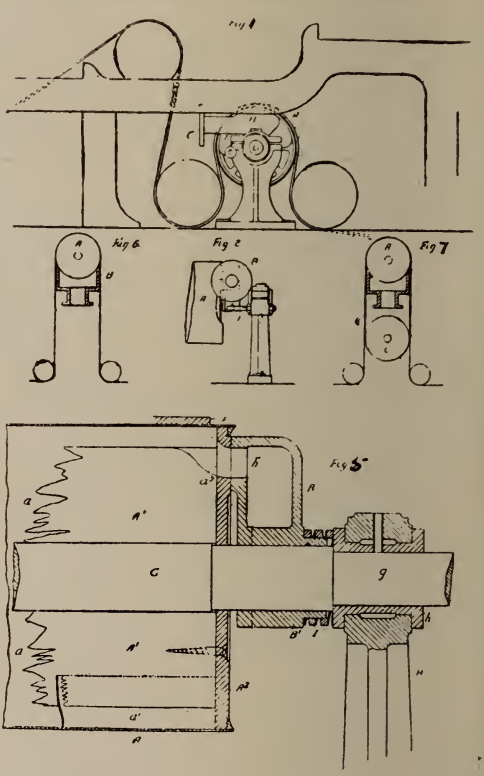
	1899.	1904.
Writing papers, tub-sized	7	10
Writing papers, engine sized..	24	27
Printings and news.....	28	28
Cartridges	22	22
Grocery papers	9	8
Small hands	10	9
Browns	14	13

The paper trade in Ireland shows little change.

APPARATUS FOR WASHING FELTS.

A revolving felt washer suction apparatus for washing the felts of papermaking machines has been patented in Great Britain by John White, of Edinburgh, and James Blaine, of Denny. This washer is designed to replace the stationary suction arrangement.

Fig. 1 is a side elevation showing one form of the revolving felt washer; Fig. 2 is an end elevation of a part; Fig. 3 is a plan; Figs. 4 and 5 are a cross section and longitudinal section, showing the

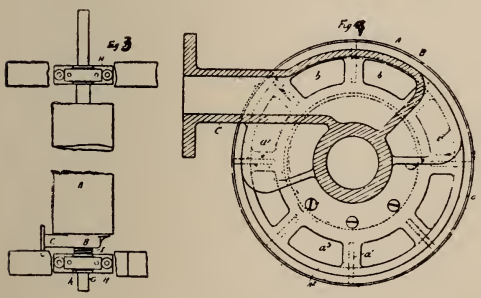


suction roll and relative parts on a larger scale; Figs. 6 and 7 are diagrammatic representations in sectional end elevations of modified forms of the apparatus.

The revolving suction apparatus consists of a perforated roll A. having an annular chamber *a* in its interior divided by webs or strips a^1 into any convenient number of chambers or compartments a^2 a^2. Each chamber or compartment a^2 is entirely separate from, and inde-

pendent of, all the other compartments. On one or both ends of the roll is placed a stationary valve box B, provided with one or more ports or chambers *b*. The valve box B is connected by a branch pipe C to a suitable air exhauster, and as the roll revolves, one or more of the compartments a^2 in the perforated roll comes or come opposite the port or ports *b* in the stationary valve box B.

The perforated roll *a* rotates, and as it revolves carries with it the felt F, which is saturated with water, and is arranged to travel in contact with the circumference of the roll A. The relative positions of the chambers a^2 in the roll A, and the port or ports *b* in the stationary valve box B, are so arranged that as the roll rotates one or more of the chambers a^2 in the roll, as they come opposite to the port or ports in the valve box, are subjected to a sucking action of the exhauster or vacuum pump, and the water (with which the felt F has been previously saturated), is drawn through



the meshes of the felt, and through the perforations in the roll A, and carries off the polluting matter with it into the chamber or chambers a^2, whence it is discharged through the valve box B into a suitable receiver.

As shown in Figs. 1 to 5, the roll A is carried by a shaft G, whose journal ends *g* are supported in bearings *h* in standards H, the valve box B being formed with a boss or eye B^1 bearing on a turned portion of the shaft G and being pressed up against the roll end by a spring I so that its port face bears closely against part of the roll end. The roll itself is for convenience of manufacture preferably made with a wooden centre A^1 fitted over the shaft G and an outer perforated shell A of metal leaving an annular chamber *a*, which is divided into compartments a^2 by brass strips a^1 extending radially from the shell A into slits in the wooden centre A^1, while the roll ends are formed by metal discs A^2 having port orifices a^3, which, as the roll rotates, come in succession opposite the port in the valve box B, which latter is held from turning with the shaft G by means of a stud J engaging it, and secured in the standard H.

In the modifications represented at Figs. 6 and 7, the valve box B is fitted to the periphery of the perforated roll A, extending the full length of the latter, while the felt F passes round the roll A and down each side of the box B and thence round guide rolls. The roll A thus runs in and is supported by the valve box B, the lower end of which is connected to an exhauster which draws the moisture out of the felt through the perforated roll A into the valve box. As shown at Fig. 7, the roll A may be partly covered by an endless band K of wire cloth or like perforated material passing also round a roll L below so that the band travels with the roll A.

BRITISH MANAGEMENT OF CANADIAN PULP AND PAPER MILLS.

New Brunswick ought to be a splendid field for men of enterprise in the pulp industry. In that richly timbered province spruce abounds above all other woods. There is no lack of water power. Raw material can be assembled at low cost. No other part of Canada, except Nova Scotia, is better situated for shipping the product on the Atlantic. Compared with New Brunswick, interior provinces, like Quebec and Ontario, would appear to be at a great disadvantage for competing for the sale of pulp in the foreign market, as they have large freight charges to pay on the long haul to the sea. Yet Ontario and Quebec have been far more successful in the pulp industry. What is the reason?

The difference between the success of the interior provinces and that of New Brunswick appears to be traceable to the difference in the capitalistic influences in control. In Ontario and Quebec the owners of the pulp mills are, with one notable exception, either Canadian or Americans. The notable exception is the Imperial Paper Mills, Limited, at Sturgeon Falls. That concern is British, but it is conducted in accordance with the up-to-date ideas of this continent. Its machinery is of American make. Better still, it is free to sell its product where is pleases, not being at the dictation of people who do not understand the business, or who would keep it tied up to certain consumers.

The Maritime Sulphite Fibre Company, whose mills at Chatham, New Brunswick, cost a lot of money, has been out of business for some time, and its works are in possession of the creditor bank. Had its British owners been better acquainted with the conditions required for the success of such undertakings, they would have seen that the timber supply secured was not one that could be quickly exhausted. They would have equipped their mills somewhat differently.

Some time ago the Cushing Sulphite Fibre Company, at St. John, N.B., closed down. More than a year before that there was trouble between the British and Canadian interests. When the latter withdrew, Captain Partington's control was supreme, but it does not seem to have been able to secure results in the highest degree satisfactory. Production is going on again, and it is hoped that earnings will increase.

What was the matter with the St. John Sulphite Pulp Company, whose mill at Mispec, fifteen miles from St. John, N.B., has been brought to a standstill? That company was also British, the controlling shareholders being Scotch capitalists, mostly paper manufacturers. Operations have not been profitable. Had the real directors of the company's affairs been Canadians or Americans, the result might have been far different. Some disadvantages that the concern had to cope with might have been overcome. Possibly a better location would have been secured at the outset. Sufficient pulp wood could not be got down the Mispec. Then the manufactured pulp had to be brought up to St. John and transhipped there. Possibly, if the company had stocked its output rather than sell it at losing prices, it could have made enough money in the high price twelve-month since last midsummer to tide over its present difficulties.—"Initial," in the Paper Mill, New York.

LOSSES ON THE MACHINE.

Losses during the manufacture of paper are not confined to ground wood, sulphite or other fibres, but they appear likewise in any additional material and colors, says the Wächenblatt fur Papierfabrikation. We observe notably two sources:

1. The loss in weight owing to the admitted dry contents of raw stuff, and,

2. Losses arising during the process of manufacture. The loss in weight arises through the difference in the weight of paper or pulp stock, and in the resulting dry contents of the finished sheet.

Paper pulp, ground wood or sulphite may contain an allowable percentage of humidity (about 12 per cent.). The ready-made paper on delivery contains from 3 to not exceeding 12 per cent. of dampness—there appears consequently a reduction of 4 per cent. and more of material. In the making of board, where a greater percentage of humidity is allowable, this loss may be unimportant, but otherwise there is no remedy regarding these losses in weight owing to existing rules in the allowance of humidity in so-called dry stock.

However, of greater consequence are the losses in stuff arising during the process of manufacture. Before the stuff reaches the machine, the leading channels, the screen and float box have to be filled with stuff in the state of liquidity, as required to run on the wire, and this amount of stuff is going to waste entirely

or in part when the machine stops. These losses increase in proportion with the number of stoppages of the machine for the purpose of cleaning or for changing stock or color. Another loss arises in the couches and wet presses at the starting and stopping of the machine during the time required to transmit the web from the wire to the wet press.

In order to regain the aforesaid losses a first-class pulp-saver is required. However, this saving has the disadvantage of being more or less unclean, and consequently unfit to be directly returned, and it should only be used in the making of inferior grades.

The most important losses are those caused during the formation of the web on the wire, on the felt and presses and through the drying process; also those caused by deficiencies in the machinery, by replacing of wire and felts, and finaliy through occasional carelessness of the attendants.

Among losses during the preparing of pulp for forming the web we mention:

1. Losses in the strainer when the stuff is not properly beaten, or rather when the screen plates do not correspond with the dimensions of beaten fibres; also when the screen is overloaded.

2. Losses during dessication of the pulp on the wire; the thinner the sheet the greater the loss in fine fibres on the wire meshes. In forming thicker web the waste is smaller in proportion to the producing quantity, because the web forms a constantly increasing sort of filter, allowing the water to escape while retaining the small fibres, although there still remains a loss. The trouble continues in the emptying of the suction boxes by the mechanical suction of the water from the web and wire and so on during the pressing on the couchers; the waste is furthermore observable in the sticking of the fibres in the wire meshes and on the felts, where they are removed by the squirting of water. In the latter cases the waste in the thin sheet exceeds that in the heavier kind, owing to the increased surface of web in contact with wire and felts.

Although the losses in fibres sticking to wire and felts are considerably reducible, whenever the stuff is properly refined into a condition required for perfect felting, yet they are of sufficient importance to demand a reconsideration regarding their reduction in the most practicable manner.

3. Losses by edge runner broke may occur when some stuff gets on the deckle strap or when the latter shows uneven parts whereby some fibres could slip between wire and strap; also when the straps have rough edges and when these edges are in contact with the edge of the web they will take off some fibres that are finally washed or squirted away. An excessive broad stream of water forced on the border will cause another waste, causing the fibre to run off between wire and couch roll, although a squirting of water under very low pressure against well beaten fibres will tend to rejoin the same with the felt.

4. Losses during pressing. Here we sustain losses in fibres, some sticking to the wet felt and others to the press rolls, whence they are eliminated by scrapers. Here we also observe waste of sizing and loading material through pressure, and there also are losses of smaller consequence in the best beaten stock.

The poorer the quality of the applied stuff the thinner the produced sheet; the larger the percentage of filling or loading matter, the larger in proportion are the losses sustained in fibres and additions. In order to reduce the lapses on the machine it is, in the first place, necessary to pay careful attention to the beating process, although nothing more than a diminution is achievable, because the losses caused by suction boxes and the wire, by couchers, presses, and by fibres sticking in various places are simply unavoidable.

According to old usages these stuffs are principally recaptured as well as may be in a save-all apparatus, in which everything gathered in the offwater can be collected. But the water that has been in contact with all parts of the machine will accumulate in these catchers, and thus it

is evident that the saved liquid could not have preserved its original cleanliness, and consequently the same should not be returned into the same paper quality from which it has seceded and degenerated. This uncleanliness is also caused by turning the water into the pulp saver during the cleansing of the machine, during stoppage for the purpose of changing pulp or coloring matter, and it also happens that the settling, sizing and filling materials may ferment within a few days and thereby cause the total saving to assume a dark coloration. The direct reapplication of these savings will inevitably cause a certain injury to the paper and an increased amount of foaming and a settling of impurities on wire and felts, thereby producing the necessity of a repeated cleaning operation and consequent wear-and tear of the machine. The older the saved stuff the more hurtful it is.

During many years the use of the liquid and stuff running from the machine for the making of the same quality has been a constant object, for that is the most practicable way to avoid loss of stuff. This saving has been practised ever since the machines existed; the loss of stuff is reduced, and the regained fine fibres tend to improve the felting quality of the sheet; improperly constructed pulp savers have, however, shown great disadvantages, produced by the settling of stuff that would soon assume a darker shade; also by the causing of increase foaming, the sticking of slime in wires and wet felts and consequent disturbances, and all these mischief makers have materially reduced the value of the saved stuff. A patent stuff water purifier furnishes proof that the saved water and pulp may be reapplied to the production of the finest qualities, and many improved arrangements of this nature are in use in mills producing the highest grades. These consist in many single but combined apartments, each serving a separate purpose, the main object being the purification of the water; in some parts the rapid settling of the fibres and their return on the machine is perfected, and yet a remnant of the water runs into vessels in which the finest fibres will settle, and whence they return to the web in the water used for emptying the beater. In this manner the losses are reduced in the most practical way, especially owing to the cleaning of the water, and I have found, and many other paper makers confirm this, that by the use of purified water the quality of paper improves, the foaming is prevented, and wires and felts remain clean, consequently there are fewer stoppages with attending loss on the machine. A special advantage is gained in a part of the arrangement where the water is allowed to rest perfectly undisturbed, before entering the space in which foamy and fatty matter separate on top, while the pulp exists below.

THE WAHNAPITAE CANAL AND IMPERIAL PAPER MILLS.

In view of the items in various trade and other journals with reference to the operation of the Wahnapitæ Canal by the Ontario Government and the anticipated injury to the Imperial Paper Mills, Mr. Campbell, Deputy Minister of Works, was interviewed and he gives the following information: The Wahnapitæ Canal, two-thirds of a mile long, connects Matagamishing Lake, one of the upper tributaries of the Sturgeon river, with Wahnapitæ Lake, and has been in operation for about five years. It was constructed by Charles Beck, the lumberman of Penetanguishene, and operated by him to get timber most expeditiously from his limits. The floor of the canal is one foot higher than high water in Matagamishing Lake, and the mode of operation is to build a stop-log dam in the spring, and back the water up into the canal. When the canal was first operated, an injunction was laid by parties on Sturgeon river; but, finding that no damage was done, they never pressed the injunction, and the canal has been operated every year without interference.

As more limits in the neighborhood were taken up, the Government pro-

posed to expropriate the canal and throw it open to all lumbermen at a reasonable toll. An engineer was sent up to investigate the situation, and he reported that no damage was done by the canal to any of the surrounding interests, as the flow through the canal takes place only for about two weeks in the spring, when the water in the river is very high anyway. Further than this, the Government was given assurance by representatives of the interests concerned (including the president of the Imperial Paper Mills), that the canal was in no way detrimental to the river. The Government then took over the canal and this season it was operated under their control. The Imperial Mills are said to appreciate the presence of the canal, as it withdraws the timber from the Sturgeon river, which would otherwise become mixed with their pulpwood lower down the stream. The Sturgeon river rises very high in the spring and is apt to float logs into the woods. The temporary flow through the canal tends to mitigate this evil, which is the most serious difficulty faced by the Sturgeon River Improvement Co.

Mr. Campbell states that there is no intention to enlarge the canal. The Government is relining it, but that is all the change that is being made.

PAPIER MACHE FROM PULP MILL WASTE.

An English patent has been granted to Carl Gaertner, of Berlin, relating to an improved manufacture of pliable or flexible papier maché articles from the waste of wood grinding mills and paper and cellulose factories, such as reliefs, friezes, figures, ornaments, floor coverings, wall and ceiling facings and the like. It differs from the processes hitherto used for the same purposes in that it is cheaper, that the plastic mass dries more rapidly, and that the finished article can be unrolled from the mould. The invention consists essentially in the use of the short fibred waste pulp that is found in paper and cellulose factories, in wood grinding mills and similar industrial establishments, and which was hitherto used solely for the manufacture of inferior quality cardboard or the like.

Heretofore papier maché articles were usually made in the following manner: Several different layers or coatings of a thick pastelike paper mass or pulp containing a considerable amount of water, and of the kind as used in the manufacture of paper, were successively applied to the mould consisting either of glue, gelatine, plaster of paris or sulphur, or of tin, zinc, iron or the like, the water contained in the paper mass being then removed by pressure and absorbed by means of a feltlike material.

According to this invention, and assuming that it be desired to make pliable or flexible papier maché articles, the mould or the model of which a copy is to be reproduced is covered with a woven material of not too coarse a mesh, such, for instance, as canvas, which, owing to its pliant nature, is capable of being pressed close against the surface of the mould, model or pattern. A thin layer or coating of paste made from the waste pulp is then applied to this backing, but without the aid of pressure, for instance, by means of a brush.

The plastic mass, in consequence of its shortness of fibre, penetrates the meshes of the material, so that the latter becomes embedded in this mass to a certain extent. At the same time the material absorbs the moisture contained in the plastic mass so rapidly that this latter, together with its backing, can be unrolled from the mould or model within a very few minutes' time. The copy thus obtained reproduces the contours of the original model in a clear and accurate manner, and is so pliable or flexible that it can be rolled up. Owing to the use of the backing material, the article can be made extremely thin, without its strength being in any wise impaired.

For many purposes, however, it is advantageous not to cover the model with a backing material, but to apply the waste pulp thereto in a thin layer, and then to

back it, in order to strengthen it with a stronger felting material, as its shortness of fibre does not possess the requisite felting property to allow it to be used alone for this purpose, and, moreover, it is brittle. For this latter purpose there can be used as a felting material a long fibred paper pulp, hair, asbestos, or the like, or else a sheet of paper or paper felt. The felting material absorbs the moisture contained in the waste pulp and is thereby rendered extremely pliant and adapts itself perfectly to the contour or outlines of the layer or coating of waste pulp, while, at the same time, the two coatings or layers become thoroughly matted together, thus giving the requisite strength and flexibility to the mass when dry, after which it can be drawn off the mould and rolled up.

The employment of the waste pulp for the manufacture of various papier maché articles will also be found advantageous for making linoleum-like floor coverings and wall and ceiling facings of the Lincrusta type. In both cases the waste pulp is used as a substitute for ground cork, which, as is well known, is expensive. The manufacture is carried out in a manner similar to that used for linoleum and Lincrusta. Linseed oil, oxidized in the known manner for the manufacture of linoxyn, resin, common resin and turpentine, are first mixed and boiled until a thorough solution and the formation of a gum-like mass or pulp are obtained. During the continued boiling and stirring of the mass there is added to it about the same quantity in volume of the waste pulp, but which, however, has been preferably first heated.

The following proportions of ingredients will be found to give good results for the manufacture of the above-mentioned articles:

	Parts by Weight.
Linoxyn, about	100
Resin, about	35
Turpentine, about	4
Waste pulp, about	150

including 20 per cent. water.

It is not necessary to dry the waste pulp, as it can be used in the same conditions as that in which it leaves the paper factory. After being intimately mixed, a pliable glutinous mass or pulp is obtained, which, by the addition of a backing material, can be made up into thin slabs, strips or the like, if it be desired to manufacture floor coverings, or which, if flexible wall and ceiling facings are to be manufactured, is pressed into the requisite moulds of wood, metal and the like. In the latter case the mould is slightly moistened with water, and the already cooled, but still pliable pulpy mass is then spread evenly upon the said mould. After applying a sheet of paper as a covering for the back, or some similar material to which the pulp will adhere, and which will prevent it from losing its shape when removed from the mould, the mass is left to itself for a time, after which the finished product, together with its backing, is unrolled from the mould and dried.

QUEBEC TIMBER LIMIT SALE.

The annual sale of Quebec Crown timber limits took place on June 22nd in the Parliament Building, presided over by the Hon. S. N. Parent, Minister of the department. There was a large number of lumbermen present, including Senator Edwards, Messrs. W. Power, M.P., Dupuis, M.P.P., B. A. Scott, McLean, St. Pierre, M.P.P., Major M.P.P., Wm. Price, Leferriere, G. Tanguay, M.P.P., the Hon. J. C. McCorkill, the Hon. N. Garneau, the Hon. E. B. Garneau, S. Grogan, McHendrie, W. Turner, Evans, and H. M. Price, to the number of about seventy-five, from all parts of the country.

Bidding was not very brisk, but the prices obtained for the limits sold were extremely good.

Mr. McCormick purchased 243 miles on the Upper Ottawa for $91 per mile, also 150 miles, at $130 per mile; also 50 miles, at $91 per mile.

Mr. Hendrie, of Hull, purchased Grand Lake Victoria, 612 miles, for $1,100, and

878 miles of limits on the Ottawa for $501.

W. Ritchie purchased 90 miles, Bostonnais Island, for $101 per mile.

Mr. Dupuis, M.P.P., bought 162 miles, Upper St. Maurice, at $156 per mile.

The Leferriere Lumber Company acquired 60 miles, on the Saguenay, for $130 per mile.

S. Grogan purchased 37 miles, on the Saguenay, for $115 per mile.

W. H. Davies, Montreal, acquired a total of 136 miles for $135 and $121 per mile.

Senator Edwards acquired considerable limits in Bonaventure, east and west, for which he paid as high as $290 for one lot of 37 miles, and the balance, 148 miles, on an average of $180 per mile.

W. Power, M.P., bought 22 miles, for $201 per mile, and the only woman present, Mrs. Blais, who owns a small mill in the Township of Cabot, Metapedia Valley, bought five and seven-eighth miles, for $101 per mile.

Dobell, Beckett & Co., acquired 50 miles, for $131 per mile.

The sale realized $258,166 on 1,703 miles of limits sold.

ELECTRIC BLEACHING.

There are, as is well known, a very large number of bleaching agents which are used in commerce and special chemical methods with more or less success, particularly where it does not so much matter about price so long as a satisfactory result is secured. The conditions are, of course, vastly different in the paper trade, where the bleaching agent must both act well and at the same time, before all things, must be cheap. Almost every bleaching agent has more or less advantages, as well as disadvantages, even the commonest of them all, namely, chloride of lime. Most paper and cellulose manufacturers still bleach with chloride of lime at the present day, and only a few of the larger works have gone over lately to electrolytic bleaching. The chief, it may be said the only, reason why electrolytic bleaching has made so little headway has been due to the fact that the cost of the plant and its working expenses were much too high, notwithstanding the distinct advantages gained. Only recently has electrolytic bleaching begun to drive chloride of lime successfully out of paper mills, a circumstance which will be greeted with great satisfaction by all those interested. There are, however, still many to whom electrolytic bleaching is a terror on account of its heavy cost, and who would on that account rather keep to the cumbrous chloride of lime. A few words, therefore, on the new plant and its advantages and disadvantages, compared with ordinary chloride of lime bleaching may be of service to those interested.

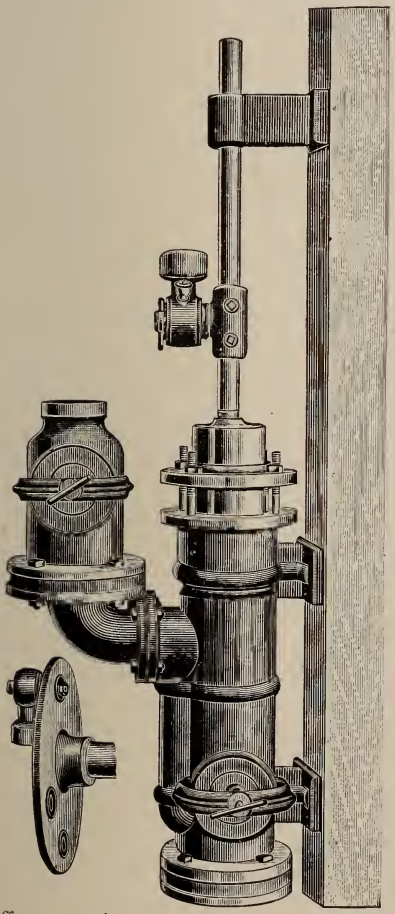
To bleach cotton, linen, flax, etc., weak solutions containing from two to five grammes of active chlorine per liter of bleaching lye are quite sufficient. For cellulose, which contains a great deal of moisture, practical experience shows that very much stronger solutions containing as much as twenty grammes of active chlorine must be used. Commercial chloride of lime contains only one-third of its weight of active chlorine, and on protracted keeping it loses still more of its available strength. The preparation of the bleach solution is extremely laborious, and the disadvantages of the lime residues, which persistently adhere to the fibres of the paper, in spite of antichlor, acids, soda, etc., are still worse. Moreover, it encrusts the wires, cloths, felts and other parts of the machinery, and causes rapid destruction everywhere. The disposal of the waste bleach and wash water into rivers is also often difficult or else prohibited. Electric bleaching possesses none of these evils; a clear solution is obtained, and the waste bleach and wash waters are free from noxious lime residues and the like. The electrical bleaching solution is prepared from ordinary salt, such as common salt (sodium chloride), which can be obtained comparatively cheap everywhere. The salt solutions, which are employed in the so-called electrolyzer, have a strength of about 10 degrees to 15 degrees Baumé.

These apparatus were formerly supplied from the electrical works with platinum electrodes, and both apparatus and plates were hitherto very costly. Hass & Stahl, of Ane, have succeeded in constructing a new automatic apparatus or electrolyzer, which requires neither costly centrifugal pumps nor cooling apparatus. This is a great advantage to the paper trade, and the cost of electrolytic bleaching plants is thereby substantially reduced, making their introduction profitable even in small mills, and replacing the objectionable cumbrous chloride of lime bleaching system with distinct advantage. Paper makers will not, and cannot, bear higher expense, and the cost of erection and working must not, notwithstanding the advantages of electrolytic bleaching, be greater than those of chloride of lime bleaching. The electrolyzer can be connected to any existing continuous current electrical plant. After the electric current has been passed through the apparatus in which the common salt solution is placed, the latter is decomposed into its two constituents, i.e., into sodium and chlorine. The sodium is liberated at one electrode, but cannot exist in the aqueous solution, and at the moment of its liberation immediately forms caustic soda with the water. The chlorine is liberated at the other electrode of the apparatus and immediately forms sodium hypochlorite in the aqueous solution, which sodium possesses the bleaching powder. The same action takes place with chloride of lime, calcium hypochlorite being formed. In commercial calculations only the effective or available chlorine is taken account of, and is estimated from the sodium hypochlorite. Suppose, for example, a paper mill has to bleach 6,500 kilos. of stuff daily, and that about 225 kilos. of chloride of lime are required; this will yield about 75 kilos. available chlorine, that is, assuming the chloride of lime to be of good quality, about one-third of the weight employed. With chloride of lime at about 18s. per 100 kilos., a kilo. of available chlorine will cost 6½d. An electrolyzer will produce 11 to 15 kilos. available chlorine in ten hours from salt solutions of 10° to 15° Baumé, and the consumption of horse-power increases with increased concentration of the solution of salt, the yield from the salt increasing of course also. Where a mill is favorably situated and has power to spare, both factors, i.e., power and salt, may be varied according to requirements and the trend of circumstances and used accordingly. Where power is cheap, and salts is dear, the solution may completely decompose by long passage of the current. Where power is scarce, but salt is cheap, the salt should not decompose to such a great extent. As a rule, a kilo. of available chlorine may be produced for from 3¼d. to 3½d., which, however, as above stated, may vary slightly in different mills, depending on the use of power and salt. Notwithstanding this, however, the price of electrolytically produced chlorine is much more favorable than that obtained from bleaching powder.

The improved electrolyzer manufactured at Ane is provided with automatic means for keeping the liquid in circulation, and as above stated, requires no pumps or cooling apparatus for the bleaching solution, all of which tends to make the total cost considerably less than formerly. Platinum is no longer employed for the electrodes, cheap prepared non-metallic plates having been recently successfully substituted for the platinum ones. These prepared plates also have the advantage of being easily removed and cleaned, or replaced by new ones. An electrolyzer of this type, with prepared electrodes, will continuously supply strong solutions containing as much as twenty grammes available chlorine per litre, which can be diluted at pleasure to suit the material in hand to be bleached. Provided good circulation of the liquid is maintained, all heating and consequent escape of the poisonous chlorine gas, which is both objectionable and wasteful, is easily prevented. All chlorine is immediately absorbed and transformed into sodium hypochlorite. It is now possible for even small mills to discard the old bleaching powder method of bleaching for the improved electrolytic method with advantage.

STUFF PUMP.

The accompanying cut shows a type of stuff pump, the merits of which have been thoroughly proved by service in leading Canadian paper and pulp mills. It is manufactured by T. McOuat & Son, successors to McOuat & McRae, Lachute, Que., who are also makers of a very successful pulp grinder. This



stuff pump is made in three sizes, the dimensions, weight, capacity and price of which will be forwarded to anyone interested. The plungers on this pump are of brass, twenty-four inches long. The valves are brass balls resting on seats, which can be made of rubber, brass or iron as desired, and so fitted that they can be replaced easily at trifling cost. Both valves are accessible without the use of a wrench. As seen, the check valve chamber is placed close to the pump, thereby insuring prompt action in starting. The crank dish provides for three lengths of stroke, 12 in., 14 in. and 16 in., and is bored for 2⅜ shaft unless otherwise required. Every care is taken by the makers to have all parts strong and durable, and it is not surprising that these pumps are so highly spoken of by users.

KEEWATIN TERRITORY.

Of the general resources of the vast region to the south-west and west of James Bay and Hudson Bay, comprising an area of half a million square miles, little or nothing is known, except from the few explorers who have crossed it at intervals in the past century on geographical researches. We know, however, from Hudson Bay employees, that there are numerous rivers that will afford more or less power for manufacturing purposes, and that vast stretches of the country are more or less timbered with elm, white, red and jack pine, ash, cedar, balsam, birch, poplar, tamarac, balm of gilead, and the spruces of the pulp producing trees of J. W. Tyrrell, the Dominion Government surveyor, says, after returning from recent surveys in the district around Hudson Bay:—

"The Aspen, or Common Poplar, has about the same northern limit as the birch, and is the most widely diffused tree of North America. It is very abundant within its range throughout the Hudson Bay district, and is one of the most valuable of the forest trees, being commonly as much as 10 or 12 inches in diameter.

"Black Spruce, is by far the most abundant tree in the Hudson Bay district, forming, I should judge, 75 per cent. of the whole forest. It is much to be regretted that this tree does not attain a larger size, being, as a rule, too small for the manufacture of lumber.

"White Spruce, though much less abundant than black, is very common

everywhere throughout the forests of the Hudson Bay district. Its northern limit, which is about the same as the black spruce, is on the east side of James Bay, in about latitude 57°, a few miles north of Richmond Gulf. On the west coast of the bay the limit extends to latitude 59°, at the mouth of the Seal River; thence it extends in a northwesterly direction, passing close to the mouth of the Copper Mine River, and on to the mouth of the Mackenzie River. In latitude 62° 15' north, on the shore of Cary Lake, I have seen white spruce trees, the largest of which measured 29 inches in diameter, 2 feet above the ground. This was, of course, very exceptional. Mr. Low reports 18 inches as no uncommon size for the species in Labrador, and 20 inches in one locality, near Lake Mistassini. Dr. Bell reports cut spruce logs on Lake St. Joseph 18 and 20 inches in diameter.

"In connection with the forest resources of the district it is very much to be regretted that disastrous bush fires are of such frequent occurrence, entirely destroying large areas of timber from year to year which may have been a century or more attaining its growth."

Mill Matters.

Wall paper manufacturers, of whom there will be four when the Menzie Company begins operating, express satisfaction with the anti-dumping clause in the tariff revision.

In order to meet the expense of providing two machines in their mill, instead of one, as at first intended, the Cornwall Paper Manufacturing Co. have made a new issue of stock to the amount of $25,000.

The new paper mill belonging to J. R. Booth, of Ottawa, will, it is expected, use all the output of the pulp mill, about seventy-five tons a day. The new mill will not be complete for about six months. None of the output of the Booth pulp mill has been sold as yet, but it is being stored at the mill. Mr. Booth has 400,000 logs and pieces of pulpwood on the Mattawa river, which he is holding back, waiting for a clearance of the booms on the main Ottawa, before releasing them into that stream.

A Canadian firm interested in the manufacture of cardboard writes to the High Commissioner in London that it is desirous of getting into touch with parties in England who could take a large proportion of their output, and perhaps also assist the undertaking financially.

The Grand River Pulp and Lumber Co., a Canadian company operating at Grand River, Hamilton Inlet, Labrador, are building up a small colony in that vicinity. About seventy men and women are settling there now, and 100 Finns with their wives will arrive shortly. The company hope to do an extensive lumbering business, timber of excellent quality being found in that region. Last year they exported several cargos of lumber, and this year they expect to treble the quantity, having had one hundred men lumbering there all winter. The company's SS. Viking, with a $60,000 cargo for the mill, was recently reported at Newfoundland.

Cornelius Shields has been appointed general manager of the various industries carried on at Sault Ste. Marie, by the new syndicate, the Lake Superior Corporation. The machine shops have started and the steel works will be turning out steel rails this month. As mentioned last month, the pulp mills are running and are now turning out about 100 tons of pulp per day. It is possible that the plant may have its capacity increased at a later date. Nearly all of the pulp is being exported to the United States at favorable prices. It is said that the drying plant will not be started up, as it is not economical to ship pulp dry. The lower price offsets the saving in freight over shipping wet, and dry pulp remoistened is not quite as satisfactory as undried pulp.

With regard to the item in last issue reporting the appointment of selling agents for Hamilton & Ayers, felt manufacturers, of Lachute, we are informed that C. A. Meincke & Co., Montreal, have been appointed selling agents for the Dominion for the firm's laundry felts, but that the pulp and paper felts will continue to be sold by the manufacturers direct to the mills.

A party of capitalists, mostly from Minneapolis, recently visited Fort Frances in connection with the erection of pulp and other mills in that town. E. W. Backus, one of the chief promoters, says his company propose developing water-power on the Rainy River, which will mean the expenditure of millions of dollars and the building up of three great manufacturing towns, Fort Frances and Rainy River in Ontario, and International Falls in Minnesota. He says further: "The company, which is now practically organized, will construct the dam, which will cost over half a million, and, in addition to the great lumber mills just completed on Rainy River, will build a large flour mill and pulp mills." The plans call for a pulp mill of 325 tons capacity daily, a paper mill of like amount, and a 3,000-barrel flour mill. The pulp mill will cover acres of ground, and employ 140 hands. R. S. McDonald, of the Backus firm, has a gang of men at work at the International Falls cleaning off 250 acres.

The new pulp mills of the Spanish River Pulp & Paper Co., are now finished and the machinery installed, and they would be in operation to-day if it were not for the delay of the contractors for the dam. This dam was to have been completed eighteen months ago according to contract, but one-third of it—and that the worst third—remains to be finished. As the mills cannot be operated till the dam is in order, the directors are holding a meeting this month to decide whether or not they will take the work out of the contractors' hands. The head office of the company is at Orillia, Ont. The president is W. J. Sheppard, of Toronto, and the secretary, is T. H. Sheppard, Orillia. John R. Barber, of Georgetown, is also a director. The mills, which will make ground wood-pulp, will have a capacity of 100 tons a day. The agreement with the Ontario Government requires the manufacture of paper also, but the Government is not insisting on this at present.

The Black-Clawson Co., manufacturers of paper machinery, Hamilton, Ohio, have the contract for supplying a paper machine for the new mill now being erected by the Rolland Paper Co.

Price Bros. & Co., of Quebec, have entered two actions against the Chicoutimi Pulp Co. One action is for damages for being deprived of water power through the diversion of water, which has interfered with the operation of their Jonquieres mill. On one of these actions the firm claims $78,000. The case of Wm. Price and the Chicoutimi Pulp Co., referred to in last issue, is another affair. On account of the statements made by Mr. Price, the Chicoutimi Pulp Co. has entered an action for libel, claiming damages to the amount of $25,000.

The Maritime Sulphite Fibre Co.'s mill, in Chatham, N.B., which has been idle since suspension of work in 1901, is offered for sale, all disputes and litigation having been disposed of. At a recent meeting of Chatham ratepayers, it was resolved that in the event of the mill being purchased and operated, the property should be exempt from all town and county taxes for fifteen years, and should be assessed for school taxes at not more than $100,000. It was understood at the meeting that there is a prospect of a good strong company taking hold of the enterprise, but it was not disclosed who the company are. The mill was originally built chiefly by Hamilton parties at a cost of nearly $1,000,000. It employed 300 hands, and distributed $115,000 a year in wages. After many difficulties, it went into liquidation, and the property came into the possession of the Bank of Montreal. The bank is now offering the

property with a large area of timber limits for $250,000, exclusive of stock on hand.

PERSONAL.

J. E. Witherbee, superintendent of the De Grasse River Paper Co., of Pyrites, N.Y., has been appointed superintendent of the Riordon Paper Mills, Merritton, Ont.

Mr. McCormack, superintendent of the Imperial Paper Mills at Sturgeon Falls, has succeeded Mr. Rantoul as general manager, retaining for the present his duties as superintendent. Mr. McCormack was formerly in one of the International Paper Co.'s mills, and later with the Union Bag and Paper Co.

In the list of King's birthday honors, is a baronetcy for Alfred C. Harmsworth, one of the proprietors of the Daily Mail, and M.P. for Portsmouth. Sir Alfred Harmsworth, Bart., is well known in Canada, in connection with purchases of timber limits in Canada and Newfoundland.

F. Finlay, on resigning the managership of the Kinleith paper mills, at St. Catharines, some months ago, returned to his native place in Scotland for a visit. He came back to Canada, and on the 1st of June was appointed superintendent of the paper mills of Barber Bros., Georgetown, which he had previously had charge of for a period of ten years.

Among the callers on the Pulp and Paper Magazine during the month was C. F. Mitchell, of Ferguson & Mitchell, Mornington, Dunedin, N.Z., proprietors of one of the three paper mills of New Zealand. The mills of that colony use New Zealand flax and rags chiefly as their raw material, and it is difficult to get wood pulp owing to the great distance and high freight rates. When the day comes that pulp can be made cheaply near the sea ports of British Columbia, and a direct line of steamers is established with New Zealand, Mr. Mitchell believes that Canada can supply the market better than any other country. Under such conditions Canada can also supply paper. At present Germany and the United States make New Zealand a dumping ground for their surplus products in paper and other lines.

CANADIAN PULP IN BRITAIN.

Canada has some distance to travel before she can be termed a dangerous rival to Scandinavia in the British pulp market according to official trade returns as summarized in the World's Paper Trade Review. The British imports of wood pulps from the countries referred to show the progress of each in five years:

	1899.	1903.
Sweden	£704,938	£1,105,093
Norway	961,563	1,054,934
Canada	130,948	168,206

In 1899 the value of the supplies from Norway and Sweden represented nearly 84 per cent. of the total British imports; last year the percentage was 86. It is evident, therefore, that the Scandinavians have not felt Canadian competition, although Norway—according to the official compilation—has not been so progressive as Sweden. The value of the Canadian supplies in 1899 represented 6.5 per cent. of the total British imports and 6.7 per cent. last year.

—An Association of Coated Paper Manufacturers has been formed in the States, with the object of interchanging opinions and promoting harmonious action, and presumably the maintenance of prices. The first officers are: President, Charles F. Zentgraf, of Louis Dejonge & Co., New York; vice-president, B. C. Hill, of the Wabash Coating Mills, Wabash, Ind.; secretary and treasurer, F. W. Moulton, of the Niagara Surface Coating Company, Niagara Falls, N.Y. The first annual meeting of the new association is fixed for October 21st in New York.

NEPIGON PULP AND PAPER CO.

The Nepigon Pulp & Paper Co. has about 1,000,000 feet of lumber on the site of their projected works at Cameron's Pool, Black Sturgeon River, and has everything ready to push construction as soon as machinery can be shipped over the railway, the construction of which is anxiously awaited. This railway, for which a subsidy was granted by the Ontario Government, from Nepigon station on the C.P.R., to Lake Nepigon, a distance of 35 miles, the point at which the mills are located being, however, only 12 miles. Owing to the lay of the land it is necessary to have the railway in order that machinery and material can be got to the mills. Not only has the company easy access to an immense tract of fine spruce timber, but no dam is necessary to secure all the power required for the greater part of the year, which with some dredging of the channel between the island and the main shore at the mills ample power can be had all the year round. The capital of this company is $750,000. The president is John R. Barber, of Georgetown, and the secretary S. C. Wood, of Rowell, Reid & Wood, Toronto; John W. Flett, Toronto, and James Conmee, M.P.P., are also shareholders. The mills will manufacture news paper, and the capacity at first will be 50 tons per day, which will afterwards be increased to 100 tons. They will, of course, manufacture their own pulp.

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Heavy rains on July 12th extinguished the fires which during two weeks devastated thousands of acres of land through the districts surrounding Sydney. The losses sustained to lumber lands and property reach in the vicinity of two hundred thousand dollars.

Nepigon Pulp and Paper Co.'s Plant.

The wing projecting out towards the island is the grinder-room, having machines with a capacity of eighty tons per day. The structures in the background behind the boiler-house are a sulphite pulp plant with a capacity of thirty tons a day. The long mill in the foreground is a two-machine paper mill of fifty tons a day capacity. The water at the foot of the island is known as Cameron's Pool, one of the most celebrated fishing pools in North Ontario.

Forestry and Pulpwood

Wabigoon reports the arrival of the biggest boom of logs ever seen on Wabigoon lake. It comprises over three and a half million feet.

Severe forest fires in the interior of Newfoundland have destroyed large lumber mills, and the railway stations in the lumbering settlements. The area of destruction is wider than that affected by any previous conflagration in the interior. The extent of the money loss, up to July 1st, was estimated at $160,000, and the fire was still raging.

Unprecedented runs of logs are reported from various parts of the country. The Upper Ottawa is choked up, being literally floored with logs. A million is said to be a low estimate of the number of logs here. The quantity of pulpwood in the river, and particularly in the Temiskaming stretch, is also away above the average. The remarkable situation of an over supply of logs was created by the high before the tail end of the former season's log cut into and down the main stream, before the tail end of the former season's cut had been removed from the booms.

A big log jam has been formed on the Rouge river at Calumet. There are over a million logs in the jam, including about seven hundred thousand pieces of pulp wood belonging to the Riordon Paper Company, with mills at Hawkesbury. The jam, which is a mile and a half long, was responsible for the destruction of the regular traffic bridge, which was piled up against the railway structure. At present about seventy-five men are engaged liberating the logs in the jam, but as the work has to be done piecemeal, it will be several weeks before it is completed. This jam is the biggest in the history of lumbering on the Rouge, and may lead to liberating the logs in the jam, but as the C.P.R. holds the municipal authorities responsible for the damage to the railway bridge, caused by the displacement of the township bridge, and the council in turn have notified the lumber companies that they will be held responsible for the destruction of the municipal bridge and the damage it has caused to the railway structure.

In one day last month 26 United States barges were assembled in the canal and river at Ottawa. They had brought coal to Ottawa and failing to get a return cargo of lumber, most of them went down the river in search of pulpwood.

The Upper Ottawa Improvement Company has 800 men and sixteen steamers engaged handling the logs on the main Ottawa. In addition, the various lumber companies have small armies of men busy on the tributaries getting the logs out to the Ottawa, where they are taken in charge by the Improvement Company.

According to the annual report of Hon. S. N. Parent, Minister of Lands, Mines and Fisheries, of Quebec, the area of timber lands under licenses from the Crown in the province during the year ending June, 1903, was 62,730 square miles. The spruce, hemlock, cedar, white birch, balsam and poplar logs and boom timber cut was 288,168,124 feet, b.m.; and the pulpwood cut was 202,633½ cords.

It is reported from London that the Quebec and Lake St. John Railway has adopted the provisions of the Act of the Quebec Legislature permitting the further issue of bonds to the extent of $1,500,000. The company has also decided to build the La Tuque branch, thirty-eight miles long, from the main line to the head of navigation on the St. Maurice. The Dominion Government has given the company a subsidy of $3,200 per mile, and the Province has made a grant of 4,000 acres of land per mile. Improvements in the line are to be made, such as more engines and cars to handle the increased traffic in lumber and pulp, and the construction of a branch line a mile in length (to cost about $14,600) from the station to the steamboat wharf at Roberval. As we reported in last issue, the financing of the La Tuque branch was the object of Manager J. G. Scott's visit to England.

LITERARY NOTES.

The 13th annual edition of the "Paper Makers' Directory of All Nations" has been issued by the publishers, Dean & Son, Limited, Fleet street, London, Eng. Judging by the Canadian section, the lists of the mills must be very complete, and for convenience of arrangement, comprehensiveness and fullness of detail as well as for portability, this appears to be the best world's paper directory in the English language. The work gives the names and addresses of the paper, pulp and board mills of each country in the world, specifying the kind of paper or pulp made, the number and width of machines, the amount of output for week, the kind of power used, the telegraphic addresses, etc. The lists of export merchant shippers of paper and the lists of wholesale stationers have been made more complete in this issue, and these and other departments have been made more convenient for reference. The lists show that there are about 5,000 mills in the world, owned by about 4,000 firms and syndicates. These are reported and classified again under the different specialties manufactured by the mills, and the whole is comprised in 548 pages, 5¼ x8 inches. The price of the dictionary is only 10s. 6d. (say $2.50) per copy.

The July number of the Canadian Magazine gives Canadian readers a good budget of holiday reading. Such sketches as an "Outing on the Bay of Fundy" by F. C. Sears, will make the citizen of our inland provinces long for a sniff of the health giving sea breeze. The series of papers, the "Fight for North America" is continued in this number. Wm. Wood, of Quebec, scores Sir Gilbert Parker for the numerous errors in the book "Old Quebec." It would appear to be doubtful whether Sir Gilbert has put out "Old Quebec" as a book of fiction or history. A feature of the Canadian Magazine of interest to business men is a department called "Canada for the Canadians," dealing with trade and manufacturing topics. In this instalment, attention is called to the official returns of trade with Germany. It appears that there has been a marked falling off in the exports of German manufactures to Canada since the surtax was imposed. The exports of dutiable goods from Germany to Canada for the nine months ending March, 1903, were $7,776,205, and for the nine months ending March, 1904, they were $5,076,383, showing a drop of over $2,500,000. This trade has been diverted from Germany to Great Britain and other countries. The official returns so far published do not specify the particular lines affected, but we understand that paper and paper products will be found to figure to a considerable extent.

PRINTING AND PUBLISHING TRADES.

The only item in the new Canadian tariff changes that directly affects the paper or printing trades is that rotary printing presses of a class or kind not made in Canada are placed on the free list.

The annual convention of the International Steel and Copper Plate Printers' Union of America was held at Ottawa, June 16th to 18th. The delegates to the number of about thirty were welcomed by P. H. Aitcheson, president of the Ottawa Union and vice-president of the International Union. The proceedings were not for publication. The bank note printers, which chiefly compose this union, are the highest paid craft in America.

The large printing and book-binding establishments, that were destroyed in the Toronto fire, are shifting their location. They will be grouped chiefly between Spadina Ave. and Simcoe Streets. Brown Bros. are building a three-story bindery in which Addison & Mainprice's printing establishment will also be located, on Wellington, near Spadina; W. J. Gage & Co.'s bindery and works will be located at the corner of Spadina and Adelaide; and Warwick Bros. & Rutter's at the corner of Spadina and King. The Rolph-Clarke Co. are building a new five-

story lithographing works on Pearl, near Simcoe, and Davis & Henderson are building on King, between Spadina and Bathurst.

The Rolla L. Grain Co., Ltd., of Ottawa, manufacturers of loose leaf ledgers, etc., have enlarged the capacity of their bindery and their pressroom.

The Mortimer Printing Company, of Ottawa, have purchased the Hotel Cecil property on Wellington Street, and will erect on it a new printing and lithographing establishment.

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—From the commercial agent for Canada at Kingston, Jamaica, we have received a prospectus of the Anglo-Canadian Commercial Museum to be opened there in September. The intention is to make a permanent exhibition of Food Products and Manufactures of Canada and the United Kingdom, which may serve both as a national and individual advertisement and as a sales agency. Jamaica's importations for the fiscal year ending March 31st, 1903, were approximately $10,000,000; of this $4,000,000 was drawn from the United States and but $600,000 from the Dominion, while every item might have been supplied equally satisfactorily from Canadian sources. It is felt that the permanent exhibition will have a strong influence in diverting this trade to Canadian channels. For the fiscal year above mentioned, Jamaica imported paper to the value of $55,000. As there is no duty on this commodity, Canada should be able to get this trade. Full information may be had by applying to the manager, Anglo-Canadian Commercial Museum, Waterloo Buildings, Kingston, Jamaica.

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—In December, 1902, the Ontario Government granted the Imperial Paper Mills Co., of Sturgeon Falls, the right to build dams at the outlets of Lake Temagami to regulate the flow of water in Sturgeon river, on condition that the natural flow of water should not be interfered with and that the dams should not be placed in position until the lake had reached its summer level. The location and plans were to be approved by the Public Works Department. The company last winter built a dam at the southern outlet, without submitting plans to the Department. They were ordered to remove the dam, but disregarding the order they built a dam on the northern outlet of the lake in May, thus completely blocking all outlets. Complaints were received by the Department of injurious flooding of shores and islands, and early in July, Inspector Rogers was sent to remove obstructions in the outlets, which would hold up the water to a dangerous height. The inspector found obstructions and removed them with dynamite, together with the two dams. Lake Temagami is a well-wooded and picturesque lake, and as a summer resort will be an important source of revenue to the Temiskaming Railway.

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—The city of Ottawa is the centre of the eastern lumber trade, and the most important distributing point for the labor supply employed in this industry. Already the question of the labor supply and wages for next season's operations is engaging some attention at this point. For a number of years past the establishment of the pulp and paper industry, the extensive railway construction operations under way in Canada, the increased industrial activity of the cities, and the movement into the Canadian West, have caused a marked decrease in the supply of labor available for the lumber woods and a rapid advance in the rates of wages paid to lumbermen, the schedule having doubled within the past few years. For the season just closed axe hands received from $30 to $32 per month and board; teamsters, $35 per month and board, and river drivers $40 to $45 per month with board; road men, $30 per month and board. The buoyancy of the lumber market and the continuance of activity in many of the branches above mentioned are stated as the chief factors that will tend to maintain wages on a high level.—Labor Gazette, Ottawa.

PULP AND PAPER MARKET.

Both pulp and paper mills are fully employed, but there is no truth in the statements made in some daily papers that a paper famine exists in some lines. Mechanical pulp is quoted in Canada at 1.80 to 1.90c. delivered, and sulphite at 1.90 to 2.10c. delivered at the mills.

The United States manufacturers are watching the Canadian market with attention, and it may be said that the U. S. market is viewed with some interest from this side. We note that Scandinavian pulp is being imported by the New England mills to the extent of about 2,700 tons a month, which is above the normal. The strike in the Wisconsin paper mills which affects 26 paper machines in the book and tissue line is still on, and latest reports do not show any material change. The strike has been characterized by deeds of violence and a good many of the quieter and better class of hands are leaving for other paper centres.

Reports from New York show that ground wood is firm at $15 f.o.b. at pulp mill. Sulphite fibre, bleached, 2.75 to 3c.; unbleached, 1.85 to 2.25c.; foreign, bleached, 3.25 to 3.40c.; soda, domestic, bleached, 2¼c.

In the British market bleached sulphite is quoted at £11 10s. to £12; unbleached, first quality, £9 to £9 5s.; ordinary, £8 5s to £8 15s.; soda, first quality, £7 15s. to £8; 2nd quality, £7 5s. to £7 10s.; ground wood, 50 per cent. moist, £2 2s. 6d.

BRITISH CHEMICAL REPORT.

The Paper-Maker, London, reports:

Bleaching Powder	ton	£4	5	0
Caustic Soda, white, 70% (rails)	"	9	12	6
Caustic Soda, white, 60%	"	8	12	6

Caustic Soda, cream 60%	"	8 10	0
Soda Ash, ordinary, 48%	"	5 5	0
" refined, 48%	"	6 5	0
Soda Crystals, bags	"	3 0	0
" barrels	"	3 7	6
Soda Bichromate	"	0 0	2¼
" Prussiate	"	0 0	3¾
Sulphur (Rock Brimstone)	"	5 10	0
" (Flowers	"	7 10	0
" (Roll Brimstone)	"	6 10	0
Ammonia Alkali, 58% ..	"	4 10	0
China Clay, best quality, in bulk, F.O.B. Cornwall	ton	£1 4 0 to £1 10 0	
China Clay, lower qualities, in bulk, F.O.B. or F.O.R. Cornwall	"	0 9 0 to 1 0 0	

UNITED STATES CHEMICAL MARKET.

China clay, dull, domestic ranging from $8.50 to $10, and foreign, from $11 upward. New business in Alkali is fairly active, and deliveries under contracts are large. Sales are reported of Domestic High Test at 72½c. for Light in bulk, and 77½c. in bags. Caustic Soda is quiet. Sales of Domestic have been made at $1.75 to $1.80 f.o.b. works. Bleaching Powder shows a continued pressure on spot and second hands have been making sales at 1⅞c. In forward deliveries July and August have been sold at 1¼c. and up. The market for July and August in Brimstone is easier and is quoted at $21.75.

PAPER STOCK MARKETS.

Montreal, 18th July, 1904.

The paper stock market is on the whole quieter than a month ago. The better classes of rags and waste papers are maintaining their values, but the lower grades in both lines are easier. Spring importations and collections

have been disposed of, and paper mills are fairly stocked. On the other hand the collection of rags has been much restricted by the low price of metals, rubber, etc., so that stocks in dealers' hands are small—and after the lull of the summer season it is an open question whether the price of paper stock will advance or recede. We think paper makers generally prefer to be well stocked at present values.

We have not changed our quotations from those of last month. Manilla rope is if anything a little firmer.

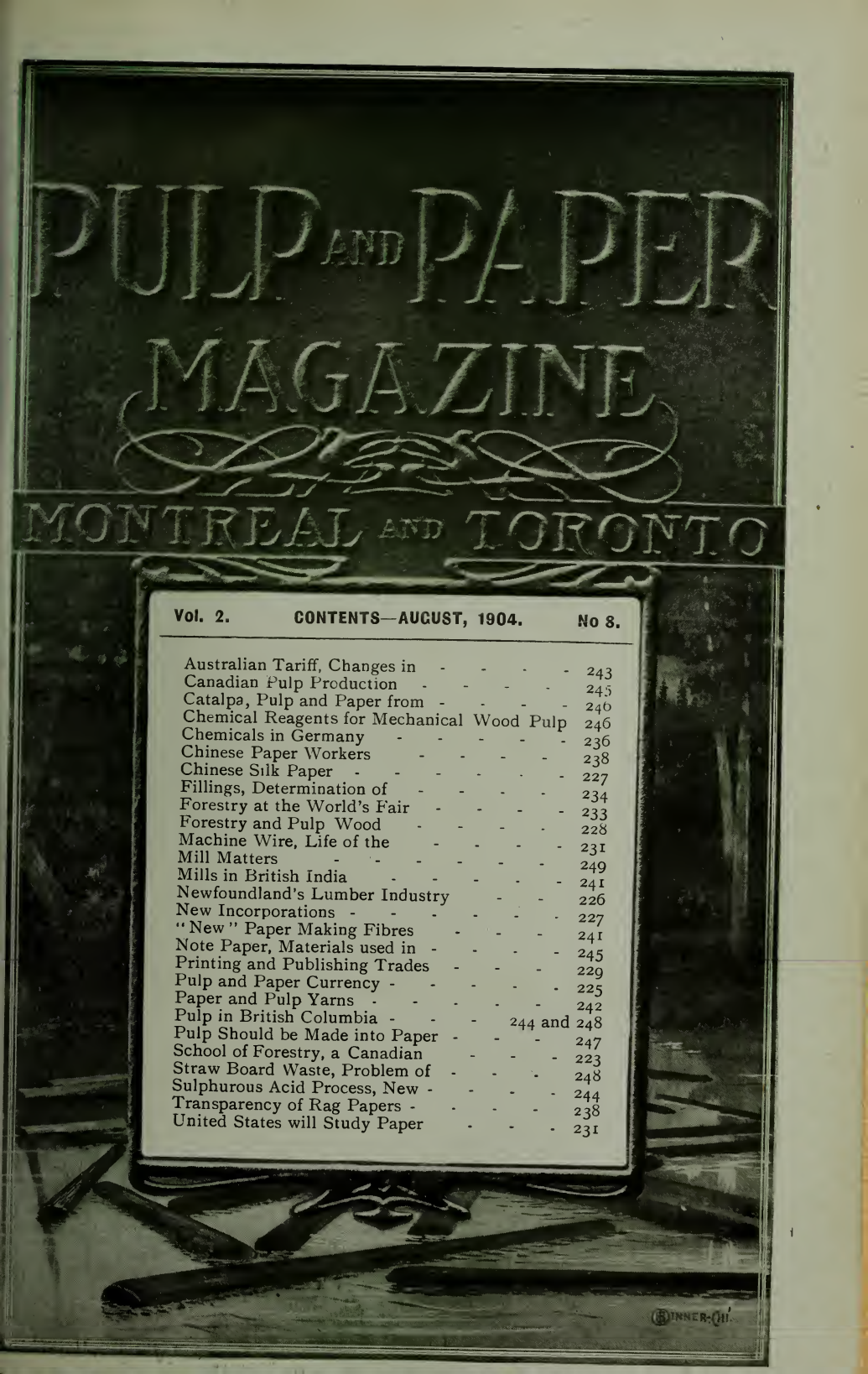
Domestic white rags	$2.00 to	$2.10	per 100
Mixed bagging ...	55 to	65	"
Blues and thirds ..	1.25 to	1.30	"
Dark cottons	75 to	90	"
Roofing paper stock	50 to	55	"
Waste papers	35 to	45	"
Hard white shavings	2.00 to	2.10	"
Soft white shavings	1.00 to	1.50	"
Book stock	75 to	90	"
Manilla rope	1.75 to	2.00	"
Sisal and jute string	75 to	1.00	"
Flax tow	1.10 to	1.25	"

BRITISH TRADE.

It is significant that, in value, the paper and boards imported into this country during 1903 totalled over 4¾ million pounds sterling; and at first sight it would appear that such an enormous purchase would have played great havoc with our own paper-making trade at home; but in actual practice it is found that, speaking broadly, this is not the case, and the reformers who agree with Mr. Chamberlain have to fight against the fact that, taken generally, our own trade during 1903 and, so far, during 1904, has been, on the whole, very satisfactory. Sweden sends us more than twice as much in the way of papers and boards as she did a few years ago; and Germany also does a substantially increasing trade. The trade with France, as regards our imports, seems to be almost stationary, and the same remark applies to Belgium. The actual value of unprinted paper from America during 1903 was only a trifle

over £263,000, against over £500,000 from Norway, over £800,000 from Sweden, over £500,000 from Holland. Belgium also sent us over £287,000 worth of printed or coated papers during last year, against which the total amount purchased from over the Atlantic appears to be quite insignificant. Holland provided us with over £600,000 worth of straw boards and mill boards, this being practically six-sevenths of our total purchase from abroad. America only sent us about £27,000 worth of this class of board. The striking feature in wood pulp boards, as imported, seems to be the enormous growth made by Russia in this direction; that country sent us over £100,000 worth of wood pulp boards during 1903. Sweden and America sent a substantial and increasing quantity, and Canada has made a very substantial advance as producers of boards of this character. It is worth bearing in mind that our possessions abroad hold a much more important position as buyers already than some people realize; and out of a total of something over £1,795,000, which was the aggregate total value of the exports of paper for 1903, our British possessions took in value £1,135,471. To what extent this great field might be developed it is not for us to say, but we would merely remark that we cannot afford to treat the subject at all lightly, and that although, doubtless, we might make more paper than we do in this country, the competition, from the broad sphere as it is, is not working that ruin of our paper-making interests in Great Britain which some people would have us believe.—The Paper Maker.

—Reports of bush fires have been received from points along the Gaspe coast below Quebec. Already, damage to the extent of $30,000 has been done. At Pabos, a lumbering village, twenty-seven buildings were destroyed and a million feet of lumber. King Bros.' extensive sawmills were only saved with great difficulty. Rain is badly needed along the Gaspe coast, and if it holds off much longer, great damage will be done the timber interests. So far the limits in the Ottawa, Nipissing, Kippewa, Temiscamingue, Georgian Bay and other lumbering districts of Ontario and Quebec have escaped forest fires.



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THE
PULP AND PAPER MAGAZINE OF CANADA

VOL. 2.—NO. 8. TORONTO, AUGUST, 1904. $1 A YEAR. SINGLE COPY 10c.

Pulp and Paper Magazine

A monthly magazine devoted to the interests of Canadian pulp and paper manufacturers and the paper trade issued between the 15th and 20th of each month.

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Changes of advertisements should be in the publishers hands not later than the 10th of the month, and, where proofs are required, four days earlier. Cuts should be sent to the Toronto office, by mail, not by express.

BIGGAR-SAMUEL, LIMITED,
PUBLISHERS
18 Court St., TORONTO. Fraser Bldg., MONTREAL

A CANADIAN SCHOOL OF FORESTRY.

It is only within the past few years that forestry has received anything like adequate attention on this continent. The United States, realizing the necessity of preserving existing forests and of reforesting denuded land, brought over trained foresters from Europe. Conditions in Europe, however, are different from those in the States, and it was soon found necessary from many considerations to establish schools and train native talent in the new science.

Cornell was the first university to take up the matter, and the forestry school there was opened in 1898. The school continued in most successful operation for five years, during which time the number of students increased from five or six during the first year to 74 during the session of 1902-03. Those who completed the course found ready employment in the federal forestry service, and to some extent in the management of private forest lands. The Cornell school was the largest in its time, but it closed its doors in June, 1903, on account of a veto on the State's appropriation, and its future is still uncertain. In 1900, Yale University organized a forestry school, which has since grown very rapidly. The Yale school differs from the Cornell school in that the requirement for entrance is graduation in an arts or science course. The forestry course at Yale is of two years' length, while the Cornell school was an undergraduate school having a four years' course, with regular university matriculation for entrance. The objection to the undergraduate course is that the men on graduating are less mature than they are where the entrance requirement is a bachelor's degree. This is especially important in a new profession like forestry, inasmuch as graduates are to a large extent thrown

on their own resources and require maturity of judgment.

Next to the Yale school, which is the largest and best-equipped forestry school in America, is the University of Michigan Department of Forestry. Prof. Roth, who is in charge, is probably better known in Canada than any other American forester. The department was organized in the fall of 1903, and followed the Yale plan of demanding university graduation as an entrance requirement. Harvard University, in which forestry instruction was also begun, in the session of 1903-04, has not as yet definitely decided on a policy, but it is probable that they will also adopt the graduate requirement.

Besides these three forestry schools at Yale, Michigan and Harvard, instruction in the subject is given at the State University of Maine at Orono, the Michigan Agricultural College at Lansing, the State University of Nebraska, the Massachusetts Agricultural College, and a few other collegiate institutions. These courses, as a rule, have two purposes; they give agricultural students an adequate training in farm forestry, so that they will be able to handle their own wood lots; and the students also receive a more or less general training in forestry with a view to preparation for the regular forestry schools.

As yet, Canada has no School of Forestry.

We are now paying for rangers more than trained foresters are getting in the United States. We might as well have trained men and we should have a school in which they could be trained. Of course Canadians may be trained in American schools, and many go to study forestry in the States, but they seldom come back. In the Forestry Bureau, at Washington, there are at present several Canadians on the staff. The fact that Canadians go across the line to forestry schools shows that there is a demand for a school in this country.

The same consideration that prompted the establishment of schools of forestry in the United States demands the founding of a Canadian school; that is, the necessity of special training for special conditions. As European training is not suited for the practical man in America, so the training given in the United States is not suited to conditions in Canada. Canadian conditions are essentially different from those in the United States. The different States that have undertaken forestry instruction own no land, or very little. What they do own has been repurchased or is land that has been abandoned for taxes after the timber has been stripped from it. So the question in the United States is largely one of reforesting denuded land. In Canada, this is not the foremost question. We have in this country large areas of standing timber. Ontario alone has 40,000 000 acres that will always be forest land, that are not suited for agriculture. The question in Canada is the management of our forests so that they will reproduce themselves without artificial planting or seeding. The question of reforestation is, of course, of interest in Canada, and will become more so as time goes on, but the most important problem at present is that of forest management. On that account we should have our men trained in a Canadian school that takes cognizance of Canadian conditions.

We are glad to record that a movement is being made in this direction. It is intended that there shall be a professor of forestry in the Ontario Agricultural College next year, and there is a possibility of lectures in the subject there this year. Lectures in the School of Practical Science, Toronto, and also in Kingston are a probability for this year, these courses treating the subject from an engineer's point of view. We now have a Provincial Forester in Ontario in the person of Judson F. Clark, Ph.D., and it is hoped that such progress will be continued until we shall have an advanced forestry policy in active operation, and a well equipped school for the training of specialists in this line.

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Pulp & Paper Currency

A maker of an extra fine grade of news in the United States uses nothing but "Soo" dry pulp, and prefers it to the wet pulp. The dry pulp is clean, and can be stored away anywhere, whereas wet pulp is constantly collecting dirt, and is liable to mildew and frost. In the use of dry pulp, more time is required. A mill suitable for wet pulp would not be satisfactory for dry pulp, as more beating is necessary. Where four beater engines are required for wet pulp, five would be needed for dry. Of course the manner of drying has a good deal to do with the satisfactory service of the pulp.

A citizen of Macon, Georgia, has been investigating the facilities for paper making in that state. He finds that the supply of wood for pulp making is practically unlimited. Four of the most abundant woods along the water courses and in the swamps have been tested by an expert, and are pronounced good pulp woods. Magnolia, poplar, red and sweet gum and ash are the most abundant. The cost of wood, delivered, would not exceed $3 per cord. Clay is found within ten miles of Macon. It has been extensively developed, and has a wide market. It is used in connection with English clays, and is in many cases equal, if not superior, to the imported article. Clay would be shipped in bulk to a paper mill located in Macon, at a cost not exceeding $3.50 a ton. The locality is also the source of supply for rosin, so the principal raw materials are to be had at low cost and in great abundance. Good steam coal can be laid down at about $2.75 per ton. Artesian waters can be had practically without cost.

Three grades of paper of fine quality have been made at Niagara Falls, N.Y., in the plant of the Pettibone Cataract Paper Company from material obtained from cotton seed hulls and flax fibre. The latter raw material was supplied by the By-Products Paper Company, which concern has conducted a long series of experiments on the treatment of cottonseed hulls and flax fibre. The cottonseed paper is a bleached product, soft and tough. It is thought that writing paper can be made from the hulls. The flax fibre makes a paper much like linen, and it is believed that the material has a great future. The experiments indicate that South and West have a new source of revenue in their cottonseed hulls and the flax straw, which up to this time have been practically worthless.

Writing in the Wochenblatt fur Papierfabrikation, C. D. Ekman calls attention to the extreme fitness of the bamboo fibre for mixing with sulphite wood pulp to improve the quality of the paper and to take away its "woody" appearance. In length of fibre, softness, and whiteness, bamboo pulp is equal to the best cotton pulp. The bamboo is obtainable in unlimited quantities in tropical climates, but the cane itself will not bear the cost of transportation to Europe. The pulp would have to be manufactured in the district in which the bamboo is grown. Every species of bamboo is not equally suitable for pulp making, the pulp is generally difficult to bleach and requires a large proportion of bleaching powder. Some species can be bleached to a good white with 15 per cent. of bleach, while others, treated in the same way, give a poor color with even 25 per cent. of bleach. Only the fully grown canes can be treated economically.

NEWFOUNDLAND'S LUMBER INDUSTRY.

Not many years ago, pessimists used to scoff at the idea of our having any forest areas worth cutting, and proclaimed that we lacked the lumber for the commonest needs. And, so general was that impression, that until quite recently we actually imported the great bulk of even the small lumber we required. Now all that is changed and in addition to supplying all our local wants, we have also millions upon millions of feet, worth hundreds of thousands of dollars, available for export and being shipped to foreign markets annually.

The tale of our progress in this respect is told in the following exhibits. The first gives the revenue statistics of the Crown Lands Department for the past five years:

1898-9	$ 3,341 48
1899-0	9,505 11
1900-1	11,795 87
1901-2	14,242 92
1902-3	26,704 25

Up to a few years ago, this department did not collect sufficient revenue to pay the salaries of the staff, now it helps materially to swell the general revenue. The increase from $3,341, in 1899, to $26,704, in 1903, is a great record, but the figures of revenue for the eight months from July 1st, 1903, to February 29th, 1904, will enable the public to see what greater prospects are in store for us, they showing thus:

Timber	$30,168 37
Minerals	7,435 00
Agriculture	1,124 85
	$38,728 22

It will thus be seen that the monthly revenue of this department is greater than the annual revenue five years ago. This is due to the fact that the present Government passed the amended Crown Lands Act of 1901, which imposes a bonus on timber areas of $2 per square mile, $2 a year rental, and 50 cents royalty per 1,000 feet, board measure, on all lumber cut off these areas. The purchase of the Reid lands and the introduction of the new Land Act resulted in increasing the yearly revenues of our Crown Lands from $3,341 to nearly $50,000 per annum. It enables the Government to protect the equitable rights of the lumbermen, it protects the rights of squatters, it secures a right of way around lakes and rivers, and the lands remain forever a valuable asset, yielding annually in rents and royalties sufficient to pay $34,000 interest on the purchase money and leaves a handsome balance as a yearly profit on the transaction.

The appended data attests the magnitude of the growth of our lumber exports:

Year.	Million Ft.	Value.
1898-9	1,337	$ 13,335
1899-0	9,604	100,208
1900-1	4,900	61,642
1901-2	6,200	96,403
1902-3	17,892	232,176

But remarkable as are the foregoing figures, they are outclassed entirely by those for the last half-year of 1903, from July to December, when they were 21,876,000 feet, valued at $306,460.

Last year the export of lumber from Labrador was two million feet, and the cut there the past winter was not less than five million. According to the Finance Minister competent authorities estimate the probable output as the result of last winter's cut will not be less than 65 million feet.

This is truly a wonderful development in a few years, and is but an index of what is to come in the future, when pulp-making is added to our list of industries. It also enables us to properly appreciate the value of our forest wealth, and indicates to the Legislature the duty of protecting the woodlands by the enactment of laws relating to reforestization. It is worthy of note that whereas the census of 1891 gave only 625 persons as engaged in lumbering, the census of 1901 showed the number to be 1,408, and we are assured that at present it is at least 2,500.—St. John's (Nfld.) Evening Herald.

NEW INCORPORATIONS.

The Canadian Timber Co. has been incorporated at Ottawa with a capital of $250,000 to manufacture lumber, pulp, and paper, and to distribute electricity. The charter members are: W. B. McAllister, of Ottawa; J. W. Bryson and J. W. Hennessey, of Fort Coulonge; H. S. Dowd, of Quyon; W. Anderson, of Ottawa, and J. A. Cameron, of Dominionville.

The Canadian Newspaper Co. has been incorporated at Toronto with a capital of $40,000. The provisional directors are: E. H. P. Thompson, of Morrisburg, and A. H. Lougheed, C. W. Laker, and J. Ellis, of Toronto.

The Library Bureau, of Canada, Limited, incorporated under Dominion charter, has been licensed to do business in Ontario.

CHINESE SILK PAPER.

It was towards the close of the first century that the first "silk" paper was made in China. A great mandarin discovered the secret of making a fine paste with the bark of several trees and old silk stuffs by boiling them in water. With this paste he made different kinds of papers. To-day this paste is made of hemp; of the bark of trees, particularly the bamboo; of rice and wheat straw, and even of the little skin which is found in the cocoon of silkworms.

The Chinese manufacture, it is said, paper which is sometimes sixty feet in length; it is nearly impossible to form frames as long as this and to have vats of corresponding dimensions. It is probable that they manufacture it in several pieces, which they cunningly unite at the moment of laying down.

Upon being taken from the form, the sheet of paper is placed on a wall coated with very smooth mastic. This wall is hollow inside, and heated by a furnace. The placing of the sheet on the wall is done by means of a brush, which is depicted in the form of a feather. This operation of the brush explains the streaks which are seen on the wrong side of this paper, while the side in contact with the wall is brilliant and satiny. This system of drying possibly contributes to the quality of receiving impressions, which this paper possesses almost to perfection.

As this paper, on account of its fineness, could not sustain itself, and would not present sufficient fulling to receive the impression, it is pasted on wove paper, without size, which serves as a lining for it, which frames it, so to speak, by margins, the whiteness of

which heightens its color. This pasting demands particular preparation.—Printer and Publisher.

Forestry and Pulpwood

Large quantities of spruce pulpwood are being shipped from eastern Quebec to mills in Indiana and Ohio.

A recent report stated that there were about thirty million logs hung up on the upper waters of the St. John river.

New Brunswick has suffered from fire during the past month, some 6,000 acres of valuable timber land being burned over in Westmoreland county.

Extensive forest fires raged last month on Vancouver Island, B.C. In the mountains behind Ladysmith the worst fires in many years were reported. Serious damage was done.

Gilmour Bros., of Ottawa, have a contract to supply 2,500 cords of pulpwood to C. P. Watson, of Plattsburg, N.Y. The wood was cut in the Gatineau district, and is now being forwarded by rail.

Ottawa and Renfrew lumbermen are applying to Ontario Crown Lands Department for permission to build a dam on the height of land north of Lake Temiskaming to get a flow of water to float logs to Ottawa.

The Quebec and Lake St. John Railway is now calling for tenders for the construction of the La Tuque branch. This line will reach the headwaters of the St. Maurice and open up a country rich in pulpwood, waterpowers and agricultural possibilities.

Serious forest fires are reported in Newfoundland. The railroad is almost blocked by the flames and the smoke makes navigation impossible at night along some parts of the coast. It is estimated that $20,000,000 worth of marketable timber has been destroyed in the interior. The outskirts of St. John's are threatened, and at last accounts a force of police had gone to the scene to protect city buildings.

Forest fires have threatened serious damage in Ontario, but in several cases opportune showers have helped the rangers in preventing the spread of the blaze. The Biscotasing district suffered recently, but to what extent it is not known. Fires have also been reported in the Temagami reserve.

Along the Ottawa and its tributaries a great deal of timber is stranded, and the Upper Ottawa Improvement Co. is at present too busy with the wood which fills the streams to pay any attention to the logs that are hung up along the banks. It is stated that a million and a half pieces of spruce were floated into the Rouge this year, mostly pulp wood. Some time ago trouble was caused by a jam on this river at Calumet, two bridges being damaged by the jam. After a couple of weeks' work the logs were set free, but immediately began to jam again at the same place.

The Ottawa correspondent of the Paper Mill thus describes the situation on the Ottawa:

"So great was the movement of logs on the Upper Ottawa this summer that a new boom had to be thrown across the river at Rocher Capitione, a point about twenty miles above the Des Joachim's boom. The latter gave way about six weeks ago, releasing 300,000 logs.

"After it was repaired, it was decided as a further measure of protection to it and the lower booms to put in a new one up stream. Had this step not been taken the old booms along the river would have been snapped, as the logs were pouring out of the tributaries faster than they could be taken care of in the main stream. The new boom was established by the Upper Ottawa Improvement Company, that has charge of all the logs on the Upper Ottawa.

"To give a further idea of the size of the stock of logs on the rivers, it may be stated that there is one jam on the Quyon river, a Quebec tributary of the Ottawa, in which the logs to the number of 400,000 are piled ten feet deep along the stream. As the main Ottawa

is a wide, swift moving stream, no logs 'jam' on it, the danger being confined to the breaking of booms.

"Reports show that the movement of pulp wood was a big one this season, the principal streams being the Gatineau, Lievre, Temiskaming, Rouge, Coulonge, and Dumoine. All these streams are full of pulp wood. The high water brought it down six weeks earlier than in former seasons. Logs that usually did not get down till August reached the main streams this year in June and early July."

Reports from British Columbia show that forest fires are working havoc in the limits along the coast. At some points the bush fires raged for five days. Heavy rains eventually fell and checked the flames.

According to Government returns, the settlers in the Temiskaming district last year cut 13,232 cords of pulp wood, valued at $36,388. It was purchased mostly by the E. B. Eddy Company and J. R. Booth. In all, the settlers took out timber valued at $232,788.18, and as about 300 were engaged in this work, each received nearly $800.

Labrador promises to rival Eastern Canada as a pulp wood producing centre. A correspondent, who has just returned from a trip through Labrador, writes as follows: It is known that almost limitless areas of pulp wood exist there, and the country is destined ere many years to become one of the great pulp-producing regions of North America.

The following comparative statement of the amounts collected annually since 1867 in Quebec for ground-rent, bonuses, transfer fees and timber dues gives a good idea of the development of the timber and pulp industry: 1867, ground rent, $22,401.03; bonuses, $3,928.50; timber dues, $60,381.77. 1902-3, ground rents, $187,206.25; bonuses, $352,004.58; transfer fees, $20,076; timber dues, $657,631.96.

The Pentecost Lumber Co., of Watertown, N.Y., has spruce wood holdings in Quebec, and from these will supply the pulp and paper mills of northern New York with pulp wood. Frontage on the St. Lawrence has been purchased at Cape Vincent, where a receiving station is being established. A large dock is being built, and pulp wood will be taken from boats and loaded on railway cars by electric conveyors, which will be capable of loading seven cars at a time. The company has storage ground at Cape Vincent for 10,000 cords of wood. The power house and machinery will be completed this fall.

PRINTING AND PUBLISHING.

Mactalla, the only Gaelic paper published in the world, which has been issued by the Mactalla Publishing Co., of Sydney, N.S., ceased publication last month. It was established twelve years ago.

Warwick Bros. & Rutter, manufacturing stationers, of Toronto, did not exhaust their bad luck in the big fire last April, but were visited again on July 29th in their temporary premises. The fire brigade did prompt work, and prevented what might easily have been a disastrous fire.

The Postmaster-General of the Commonwealth of Australia, replying to the British Postmaster-General's proposals for the establishment of a penny post between Britain and Australia, stated that the arguments against the adoption of such a system were at present unanswerable.

The Copp, Clark Co., of Toronto, are occupying part of their new building, on the site of the one destroyed in the big fire of April last. This firm is the first to move back to the old stand, and holds a record of 110 days from the time of the fire till the first load of goods entered the new building. Three flats are now occupied, and it is expected that the building will be complete by about October first. It is fully equipped with fireproof partitions, etc.

The Canadian Voice is the name of a new Polish paper recently established in Winnipeg. It is a weekly paper, published every Friday by the Polish Printing and Publishing Company, under the directorate of a president and committee. It is nicely headed and printed, and claims to be the first Polish paper ever published in America.

—"The Laurentide Paper Company, of which Sir William Van Horne is president, has made a cut in its dividend from 8 per cent. per annum to 6 per cent., as indicated by the dividend announcement for the first half of this year," says the Montreal Star. "The half-yearly payment of 3 per cent. is payable on August 5th to shareholders of record July 30th. The last half-yearly payment was 4 per cent. in February for the last half of 1903. The company has $1,600,000 common stock and a bond issue of $1,200,000. According to the statement issued a year ago, the company had a surplus of $270,917, after paying $128,000 in dividends. In 1900, the company paid 6 per cent., but for the three following years the rate was advanced to 8 per cent. The stock has not been an active feature of the trading in the market, and the price from 95 last year declined to 74½. During the first half of the current year the trading amounted to ninety-eight shares. The dealings last year were 800 shares, compared with 2,450 the year previous. The highest price for the stock was in 1901, at 125, when the dividend was increased from 6 to 8 per cent."

—According to the business reports for 1903, out of twenty-eight public companies in the Russian paper trade only thirteen paid dividends, ten worked without profits and five with loss. The dividends give an average of three per cent. on the share capital. It is believed that those mills which are in private possession have shown much better results.

—The Paper Makers' Directory of All Nations, for 1904, shows that there are pulp and paper mills in forty-two countries, namely: Algeria, Argentine Republic, Australia, Austria-Hungary, Belgium, Brazil, Bulgaria, Canada, Chili, China, Cuba, Denmark, Egypt, England, Finland, France, Germany, Greece, Holland, Hong Kong, India, Ireland, Isle of Man, Italy, Japan, Mexico, New Zealand, Norway, Peru, Portugal, Roumania, Russia, Scotland, Sicily, Spain, Sweden, Switzerland, Tong-King, Turkey, United States, Uruguay, Venezuela. Of these, fourteen have fewer than five mills, and ten have only one mill each, namely, Algeria, Cuba, Egypt, Greece, Hong Kong, Peru, Sicily, Tong-King, Turkey and Uruguay.

Canada stands about tenth in the list, having nearly a hundred mills. There are in this country:

Three soda fibre mills.
Eight sulphite fibre mills.
Sixty-two mechanical pulp mills.
Thirteen news paper mills.
Fourteen manilla paper mills.
Fourteen wrapping paper mills.
Ten book paper mills.
Eight writing paper mills.
Seven wood pulp board mills.
Five straw board mills.
One box board mill.
Six lining and felt paper mills.
Four lithographic paper mills.
Seven roofing and building paper mills.

Besides these products, there are from one to three mills producing each of the following: Bag paper, bond paper, cards, casings, colored paper, copying paper, cover paper, envelope paper, hangings, hardware paper, insulating paper, label paper, leather boards, ledger paper, posters, printings, rope, sealings, shop paper, straw wrappings, tissue, toilet paper, and wax paper.

UNITED STATES GOVERNMENT WILL STUDY PAPER.

A special order, recently issued by the Department of Agriculture at Washington reads in part as follows: "There is hereby established in the Bureau of Chemistry a laboratory to be known as the Leather and Paper Laboratory, to which are to be committed the analyses and investigations relating to all chemical and physical investigations of papers in regard to their fitness for use in the Department of Agriculture and other Departments of the Government which may request such investigations; and all technical problems of a chemical nature relating to the production of paper with a view to promoting the agricultural industries connected with the production of the raw materials and to the improvement of the quality of papers made."

LIFE OF THE MACHINE WIRE.

The life of a machine wire is a question of extreme interest, both to the paper maker and to the machine man, writes R. W. Sindall in the World's Paper Trade Review. The life is influenced by many factors, and these can be broadly divided into two classes, namely, the mechanical and the chemical conditions to which the wire is submitted. With regard to the former it may be noticed that the wire cloth as usually supplied is manufactured with great care from perfectly drawn round wire, and in the best qualities no fault can be found either with the cloth itself or with the seam, which latter is usually the cause of a considerable amount of trouble. In some cases the seam is beaten down somewhat too flat, with the result that it often becomes choked with small fibre and resinous matter, producing weak places in the paper. At the present time the wear and tear of the wires is greater than it used to be, as the speeds generally are much higher, and the amount of friction is, therefore, correspondingly greater.

Assuming that the wire is in perfect order when received from the manufacturer, then it is important to exercise great care in putting the wire on the machine. If the wire is bent at all while being placed in position there is a liability to produce cracks across the bends, and the continual strain and friction of the wire cause rapid deterioration. Among the many mechanical causes of injury to a machine wire, therefore, may be mentioned carelessness in putting the wire on the machine, the employment of very heavy breast rolls, the friction on the one side of the wire due to badly fitted and badly planned vacuum boxes. In the latter case the friction between the wire and the edges of the box produces a good deal of unnecessary wear, particularly on fast running machines, where the speed exceeds 300 feet per minute.

Defective vacuum boxes are a fruitful source of injury to the wire. When we consider that machines are running at very high speeds, especially those making news, the condition of the boxes becomes a question of great importance. The higher the speed, the greater must be the suction on the wire at the vacuum boxes, and hence it is easy to see that if it should be necessary to raise up the boxes to obtain a close fit between the wire and the edges of the boxes, the wear and tear is excessive. In cases of this kind the wire often breaks across the seam, or across some place in the wire which the machineman has sewn up. A wire 40 feet long travelling at the rate of 280 feet a minute, and passing over two vacuum boxes, each 9 inches wide, is thus dragged seven times over the boxes, which is equivalent to a drag over a flat surface of no less than 126 inches. This must cause a very large wear and tear of a wire, which is considerably aggravated if the boxes are in bad condition.

Now, in addition to the pull of the boxes, which tends to restrain the wire in its course through the couch rolls, there is the pull exerted by the pressure of these rolls, a force which, tending to

draw the wire away from the boxes, intensifies the tension. The strain on the wire is derived from the pull at the vacuum boxes, the tension at the couch rolls, and the shake at the wet end of the machine.

The life of the wire, as influenced by the chemical conditions, may be traced to the influence of chemicals which, for the most part, tend to give the presence of free acid. Thus, in the cleansing of the wire from fibres and foreign matter, sulphuric acid is used, particularly for cleaning the wire at the seam. There is very little doubt that the use of sulphuric acid tends to keep the wire clean, not merely in dissolving out mineral matters caught in the meshes and in loosening fibrous particles which have been twisted upon the threads, but also in clearing the wire from a thin film of dirt and oxidized matter which always appears upon the whole surface, coating the wire with a substance which apparently, after some days' working, renders the wire less pliable. In addition, the acid appears to restore the pliable nature of the wire by some curious action, possibly of local heating at the point of contact. Another annoyance to be met with is the appearance of black specks, due to particles of badly-cooked resin, or to resinous matter contained in the inferior qualities of sulphite wood pulp. These particles, when found to materially affect the appearance of the finished sheet, must be got rid of.

The vitriol generally attacks the resinous matter sufficiently to enable the washing-pipe to clear it away, but obstinate cases require the use of a little strong caustic soda or a quantity of paraffin, and subsequent washing or steaming. When the vitriol does not remove matter of this kind, the obstruction can only be shifted by shutting down the machine.

Sulphate of alumina, used for sizing, is often regarded as a source of injury to a machine wire. The injury, when traced to this compound, is due to the presence of free acid in the commercial product. This is now got over by the use of a basic sulphate of alumina, which, though somewhat expensive, may be regarded as economical when studied in relation to the machine wire. Another source of free acid is to be found in the excessive use of antichlor. When this compound is used to neutralize traces of bleach in pulp, a certain proportion of free acid is produced, and this tends to injure the wire.

In some cases the indiscriminate use of hyposulphite makes a very considerable difference to the life of a wire. Some paper makers prefer to use sulphite of soda instead of the usual hyposulphite. A larger quantity of the sulphite is required, but at the same time the wires keep a brighter color and remain more flexible on account of their clean condition.

When the water used on the paper machine is hard, containing large proportions of dissolved carbonate of lime, a considerable deposit is found upon the machine wire with certain classes of pulp, particularly wood pulp. These deposits tend to block up the wires by diminishing the size of the small holes, so that the water does not free itself from the pulp so readily. With esparto and straw pulps, boiled under the caustic soda treatment, the wires are usually quite clean, owing to the small percentage of alkali which remains with the fibres, even when the washing process has been thorough and exhaustive. With wood pulps, however, the contrary effect is produced, and the machine wires gradually block up from a deposit of alumina.

In estimating the work done by a machine wire by determining what is known as the life of the wire, the true value is ascertained by noting the actual quantity of paper run off during the time it has been upon the machine. The length of time itself is no measure of the life of a wire, as the latter might stand idle for some short periods during its stay upon the machine, producing no paper, and eventually show a very long life. The life is, therefore, best expressed in tons.

The numerical value in tons of paper naturally depends upon the various con-

ditions which have been briefly alluded to in this article, but the question of the furnish of pulp, the chemicals added to the beater, and numerous other conditions cannot be neglected in the attempt to arrive at some figure expressing the life of the wire. It is, however, quite possible to ascertain, with some degree of accuracy, the average life of a wire making a particular class of paper, where the conditions, week in and week out, are not materially altered, and it is a matter which the paper maker should not overlook.

FORESTRY AT THE WORLD'S FAIR.

In the Forest, Fish and Game Building at the World's Fair there are numerous exhibits which have an interest to the general public as well as to the students of forests.

Many foreign countries have sent large collections, among them Great Britain, Germany and France, each of which have creditable displays.

Mexico has a very fine collection of tropic woods.

Brazil has a remarkably fine display of tropic woods, gorgeous plumaged birds, medicinal herbs, cordage and fibre plants, and plants which yield tannin. The collection comprises 1,300 varieties of woods.

The woods shown from Japan are beyond expectation for an oriental country, the forests of the far eastern regions being usually of small extent. The bamboo collection is exceedingly good.

From Ceylon there is a log of fine texture, one-fourth section having been removed, forming a writing table, the remainder being hollowed out forms a library, which contains forty-four large printed volumes.

A grand jungle scene, with a family of leopards watching for their prey, is also seen in Ceylon's exhibit. Numerous Indian boats, Catamarans and surf boats are also present.

The British section is largely taken up with displays of fire arms, hunting guns, etc., although a large collection of photographs of typical trees and trees of historic interest makes a pleasing and valuable exhibit.

The only actual forest experiment, outside the building, so far as we have been able to discover, was made by the New York Forest, Fish and Game Commission. It comprises a variety of evergreens, from one year seedlings to trees three feet high, and a number of rows of deciduous trees.

The International Society of Arboriculture requested the privilege of planting some trees as a forest exhibit, but was refused permission by the Washington authorities.

Within the building the New York Commission have a large and well arranged exhibit of the wild animals, game birds and the fishes of the Empire State. A valuable educational exhibit is shown of photographs of native trees, with wood sections, all classified and arranged in frames for ready reference. A large collection of insects and sections showing their methods of forest destruction is very instructive. The Adirondack Cottage is an attractive portion of New York's display.

The exhibit of Washington comprises a large number of wild animals handsomely mounted and displayed; the salmon and fish industry, with many large specimens of fish, and one fir tree stump, which is hollowed out and occupied as an office.

The editor of Arboriculture has seen in Washington's mountains trees of much greater size than this: one, a cedar, Thuja gigantea, being 63 feet girth, and 285 feet high. This is a land of big trees and great forests.

Oregon's exhibit attracts great attention. Mr. Edmund P. Sheldon, the superintendent, has succeeded in his collection of articles and their arrangement in placing Oregon at the fore front in the building. The woods for which this State is noted are arranged along the entire section, with long

planks of fir, cedar, pine and numerous other species of trees, while panels of each are systematically displayed. The cones of the great sugar pine are artistically arranged. Collections of all the botanical plants are ready for those who wish to study them. The fish, wild game, and birds are quite a prominent feature.

California, as usual, has made a grand collection of woods, the redwood being the principal. The polished boards, burls, and highly finished great planks are a credit to the manager, Mr. Thos. Hatch.

Louisiana contributes a good collection of woods, cypress, pine, gum, hickory, pecan and oak being the more prominent.

Mississippi has a similar collection, with panels of seventy-two varieties of trees, fifty of which possess a commercial value.

Missouri makes a fine showing with very large sections of trees, one portion of each having the fork and another portion being polished to show the grain. Many panels also are shown, while the native woods form the interior of the Missouri section.

Kentucky exhibits oak, ash, poplar, and 147 varieties of woods, seventy-two being commercially of value.

The State of Indiana is conspicuous for an entire absence of any exhibit of forest products or of forest interest.

Arkansas has quite a good collection of woods—pine, oak and various timbers.

The yellow pine of Texas attracts much attention.

Michigan displays samples of the pine timber which that State formerly possessed.

Georgia makes a good exhibit of wood sections, while the naval store's display, with a large turpentine still, attracts attention.

North Carolina has a nice display of the woods characteristic of the Carolinas. Some fine furniture and a poplar log section, six feet diameter, are prominent. A walnut log, fourteen feet long, fifty-two inches diameter, polished on one side, is seen in this section. It is shown by the veneer manufacturers, Williamson Brothers, of Indianapolis.

Our Canadian neighbors have a fine rustic design, containing 2,500 varieties of wood, but the main forestry exhibit of Canada is in a pavilion adjoining the Canada Building, between the Forestry and Agricultural Buildings. Here spruce for pulp, white pine and a very great variety of manufactured and rough woods are to be found.—Arboriculture.

THE DETERMINATION OF FILLINGS.

The qualitative estimations of mineral fillings in a paper are, as a rule, made on the ash. The practice is, however, not one to be recommended, as many filling materials suffer radical change on incineration. Thus, carbonates lose their carbonic acid, and calcium sulphate may become partially converted into calcium sulphide. For these reasons it is preferable first to extract strips of the paper with dilute hydrochloric acid. Evolution of gas when acid is applied proves the presence of carbonates. Those most frequently occurring are calcium carbonate or chalk, more rarely magnesium carbonate, or magnesite (mostly met with in cigarette papers), and barium carbonate, known as patent white. If no gas is evolved on treating the sample with acid as above described, then calcium sulphate or gypsum is probably present. The hydrochloric acid extract would therefore be tested for lime, magnesia, barium, and sulphuric acid. This latter is tested for by adding a solution of barium chloride to a portion of the hydrochloric acid extract. A heavy white precipitate should be thrown down: a slight precipitate may not be due to sulphuric acid in the filling materials at all, but may be due to small quantities of aluminium sulphate or basic aluminium sulphate, or finally, to

small quantities of calcium sulphate which are often inadvertently introduced into the pulp. If calcium sulphate is present as a filling material, a heavy precipitate will always be produced by barium chloride. A portion of the hydrochloric acid extract is tested for lime by neutralising with ammonia and adding ammonium oxalate. A precipitate of calcium oxalate will be produced if lime salts are present. As a rule, immediately after the ammonia has been added a small precipitate is produced, which is sometimes white and is due to aluminium compounds introduced into the paper in the sizing and dissolved by the hydrochloric acid; or the precipitate may be yellow, in which case it is due to iron compounds present as coloring matters—e.g., ochres—or as impurities. Any such precipitate should be filtered off before adding the ammonium oxalate. To test for barium, where barium carbonate is supposed to have been used, which, however, is very seldom the case, a saturated solution of calcium sulphate is added to a portion of the solution, and if barium is present a precipitate of barium sulphate will be thrown down. To test for magnesium where magnesium carbonate is suspected, but which is only seldom used, the filtrate, after precipitating the calcium with ammonium oxalate, can be used. If on the addition of sodium phosphate a crystalline precipitate, which takes some time to come down, is produced, magnesium is present. If there are no fillings present directly soluble in hydrochloric acid, it is possible that those employed may be silicates, china clay, talc, asbestos, or barium sulphate. Indications as to whether silicates are present or not may be obtained by means of a bead of microcosmic salt. This is done by heating the end of a platinum wire, which has been bent into a loop, to a white heat, and quickly dipping it into powdered microcosmic salt. On heating the adhering mass of salt in the flame a clear bead is obtained. A small quantity of the paper ash is now placed on the bead and the whole heated again. If small opaque fragments remain floating about in the bead the presence of silicates is confirmed. The presence of china clay may be easily detected by the fact that the ash which, as a rule, where china clay has been used, coheres well, gives a blue spot when moistened with a drop of cobalt nitrate solution and heated. To analytically determine the substances insoluble in hydrochloric acid they must be first "opened up." This is most easily accomplished by fusion with sodium carbonate in the following way. The strips of paper, after having been extracted with hydrochloric acid, are washed with distilled water, pressed between filter paper, and then dipped in a concentrated solution of sodium carbonate. The strips are next dried, incinerated, and then heated till the mass fuses. The fuse is then extracted with hot distilled water, and the insoluble portion filtered off. If barium sulphate was present in the original substance, barium carbonate and sodium sulphate will now be contained in the fuse; the latter, being soluble in water, will be found in the filtrate. By acidifying this latter with hydrochloric acid and adding barium chloride, a precipitate of barium sulphate will be produced. The residue on the filter is tested for barium by dissolving it in hydrochloric acid and adding sulphuric acid. A precipitate of barium sulphate will be thrown down if barium were present. Should the aqueous extract from the fuse give no reaction for sulphuric acid, then silicates must be present. In such case the fuse is treated with dilute hydrochloric acid and the filtered extract mixed with ammonia. A white precipitate of aluminium hydrate indicates either aluminium silicate (china clay), or magnesium-aluminium-calcium silicate (asbestos). In most cases china clay is the filling employed, as may be confirmed by the help of the microscope, being in the form of fine irregular grains, while asbestos is in the form of fine needles. If it is desired to prosecute the chemical analysis further, magnesium and calcium must next be tested for. This is done

by filtering off the aluminium hydrate and adding ammonium oxalate to the filtrate. If a precipitate of calcium oxalate is thrown down this is filtered off and sodium phosphate added to the filtrate. A precipitate which comes down gradually indicates asbestos. If no precipitate be produced the solution is still tested with sodium phosphate for magnesium, which, if present, indicates magnesium silicate—i.e., talc—and which latter exhausts the list of mineral filling materials commonly employed in practice.—Dr. Klemm, in Der Papierfabrikant.

CHEMICALS IN GERMANY.

Ernest L. Harris, United States commercial agent at Eibenstock, Germany, writes to the State Department as follows concerning the chemical industry in that country: "The statistics for the year 1901 placed the number of establishments at 10,385, which gave employment to some 150,000 workmen. The highest rate of wages is paid in Cologne and Mannheim, and the lowest rate in Hamburg and Breslau.

"The number of factories engaged in making mineral and saline salt in Germany is 97. The total output in 1899 amounted to 1,432 tons, valued at $3,684,200. The imports in 1900 were valued at $119,000, and the exports at $571,200. The annual consumption of salt by the German people is about 1,218 tons. Fully 80 per cent. of the imported salt comes from England, and the rest chiefly from Portugal, while British India, Holland, and Belgium are the principal countries to which salt is exported. The German states which produce mineral salt are Anhalt, Thuringia, Posen, Hanover, Westphalia, Bavaria, and the Province of Saxony. The most formidable competitor of the German salt industries is found in those of Wieliczka in Galicia.

"In the manufacture of potassic salts Germany has almost a world monopoly. The seats of production are in Hanover, Brunswick, Thuringia, and the Province of Saxony. Fully 50 per cent. of the total output finds its way into foreign countries. A powerful syndicate has control of the most important of these works in Germany, which demands high prices from foreign countries, while keeping the rates at home within reasonable limits.

"The annual exports of potash from Germany amount to about $1,250,000. About $100,000 worth is imported each year from Austria-Hungary. Potash is used especially in the production of soap and glass. In 1900, 4,495 tons were exported to the United States.

Caustic potash is produced principally by means of electrolysis. It is a specialty of the Elektron Chemical Works, situated at Griessheim, near Frankfort. In the spring of 1901 these great chemical works were almost totally destroyed by fire, which was attended by great loss of life. They have since been rebuilt or are in process of construction. In 1900 the total exports amounted to 15,379 tons, valued at $1,475,600.

"Caustic soda is gaining ground every year as an indispensable article in paper mills and textile factories. An electrical process with the application of quicksilver is used in the preparation of this product in the Solvay factories in Germany. This chemical is also produced to some extent in England, Belgium, and Russia. The export of caustic soda from Germany amounts to little or nothing. In order to satisfy the home markets 1,288 tons were imported from England in 1900.

"Of chloride of lime and bleaching powder Germany exported 25,954 tons, valued at $642,600, in 1900. Chloride of lime is manufactured in Germany chiefly by the Leblanc process. The Elektron factories in Griessheim produce immense quantities of it through the application of electricity. The article is used to a great extent in the textile factories and paper mills of all countries.

"In 1878 Europe produced about 1,000,00 tons of sulphuric acid. Of this England's share was 600,000 tons;

France's, 200,000; Germany's, 112,000 tons, and Austria-Hungary's, 45,000 tons. In 1898 Germany produced 846,000 tons from about seventy works, more than two-thirds being secured from Spanish gravel and pebbles. In 1897 about 1,000,000 tons were manufactured in the United States and 200,000 tons in Russia. Sulphuric acid is one of the most important materials used in the whole chemical industry. It is employed in the production of Leblanc soda, sulphate and chloride, and in dyeing.

"The greater part of the sulphuric acid produced never reaches the market, for the reason that it is at once utilized by the same factories for other manufacturing purposes. Sulphuric acid is produced from the smelting of sulphuric ore, sulphur gravel, and copper gravel. The great increase in the German production is due to the fact that the iron industries have been forced by the Government to prevent the escape of injurious acids and gases from the smokestacks of their forges and smelting works, as they proved ruinous to vegetation.

"Ultramarine was first used about one hundred years ago in France and Germany. It is a coloring material which is affected but little by light, air, and water, but easily fades in acid. This industry in Germany was once very prosperous, but owing to over-production, foreign tariffs and competition, it passed through a severe crisis about fifteen years ago, in which most of the factories were compelled to close down. Those which were able to survive have since been consolidated into a stock company, which is known to-day as the Vereinigte Ultramarine Gesellschaft.

"Successful experiments in producing artificial alizarin from anthracene were made in 1869. Chemical factories soon accommodated themselves to the new method, and the madder industry, whence this coloring stuff had hitherto been drawn, was completely ruined.

"Aniline colors are produced from aniline oil and aniline salt. The aniline dyeing industry is a product of the nineteenth century, and many great names are connected with its development. The discoveries of Runge, Hofmann, Perkin, Verguin, Baeyer, and Fischer have enabled this industry to become what it is to-day. In the manufacture of aniline Germany holds a commanding position. Raw materials such as coal tar and aniline oil, are imported from England. Under the guidance of Germany's excellent chemists these are changed into manufactured products, and their former value is increased fifty-fold."

TO MAKE PAPER IMPERMEABLE.

A paper coated with a mixture of bronze powder and varnish is patented by Messrs. Huck and Fisher, London. Before being coated, the sheets of paper are made impermeable by means of a solution of caoutchouc, chloroform or the like. The paper may be used for photographic, photo-mechanical or other printings.

EXPOSING PAPERS TO RADIUM.

Radium appears to produce in paper in a short time the same deteriorating effect as age. Probably it is an ionization in both cases. The only papers now known or believed to be durable are the hand-made pure rag papers. These are expensive and can not be used for printing half-tones on account of their rough surfaces. The problem is to find a durable machine-made paper and then have the surface made suitable for half-tones. During an attempt to solve this problem, samples from different American mills were placed on the surface of a constantly revolving disk with samples of the best foreign hand-made papers, and subjected to the radiations of pure radium bromide. The results can not be given lest they should be considered an advertisement of one mill and a condemnation to others, but the method is interesting and new. How useful it may be can be told only after many years.

THE TRANSPARENCY OF RAG PAPERS.

A few weeks ago I called attention to the complaints of the German Government officials as to the transparency of the best rag papers supplied them and the view of a large number of manufacturers on the same subject. Dr. Klemm has pointed out that one factor in this question has been overlooked. It does not appear to have occurred to anybody that the extent to which ink marks or writing will show through paper will be dependent upon the depth to which the ink penetrates the paper, that is, on the manner and extent to which it is sized. This applies, of course, not only to writing, but also to printing papers, where it is of especial importance. The transparency alone is then no measure of the extent to which writing can be seen through paper. It is necessary to examine it further with the object of ascertaining the depth to which the ink has penetrated. This can be done by cutting a section of the paper to one side of which ink has been applied, and mounting it in a medium which has no action on the ink. Under the microscope it will be seen that the ink penetrates not only the first layer of fibres, but generally the second as well, and not infrequently the third and fourth. It will be seen that the ink is absorbed, partly owing to capillary attraction of the fine pores between the fibres and partly by impregnation of the fibres by the coloring matter of the ink.

With regard, then, to the main question. A paper may prove unsatisfactory on account of writing on it showing through, not necessarily owing to transparency, but to inadequate sizing, the ink having penetrated to an abnormal extent into the paper.

In this connection a writer in the Papier Zeitung has something to say on India paper—the product of the English mills. According to this correspondent they have nothing abroad which will compare with the India printing paper as made in this country, either with respect to opacity, color or weight. Whereas the Oxford India paper has 8 to 13 per cent. ash, the foreign article contains from 30 to 35 per cent., and is in spite of this more transparent. Of course, the heavy loading greatly increases the weight of the paper as compared with English product. A microscopic examination of the India paper revealed well beaten fibres almost without exception intact and consisting of long fibrils somewhat after the appearance of hemp. The paper is only slightly sized and exceptionally suited for printing.—Dr. H. P. Stevens, in Paper Trade Review.

CHINESE PAPER WORKERS.

Of all the queer little shops or factories in San Francisco's Chinatown, the shops where paper articles are manufactured rank as among the most interesting, says Alfred Dezendorf in the Los Angeles Times. The stocks of these shops suggest spontaneous combustion. There is paper—paper everywhere, and boxes upon boxes of it still coming from China.

Ornamental and useful articles made entirely from paper, everything from a shoe to a trunk, and candles in all sizes and degrees of painted gorgeousness, are the only goods made and sold in these shops. The one end of these factories is to aid the Chinese in providing them with something to burn in the celebration of many feasts and religious ceremonies. Perhaps there is no other feature entering so largely into the superstition and religious belief of the Chinese as the burning, at various seasons, of paper representations of, it would seem, almost every object under the sun. The trade and work of these stores vary, for at one season the articles are very different from those in use at another.

A glance into the shop of Sun Tong Wo, the largest of these depots, is like opening a box of old legends, so many

are the fancies connected with the gorgeous articles of paper and tinsel which line the walls, hang from the ceiling and cram the queer little glass-fronted shelves. The window of the shop is a blaze of paper flowers, brilliantly colored punks of immense size, simpering dolls in paper dresses trimmed with fur, row upon row of elaborately ornamented paper slippers and shoes, hanging baskets, caps and banners, trunks and flags, pipes and fans, a stunning aggregation of paper.

Looking through the little shop window at any hour, one may see these quiet, solemn-looking, long-queued workmen, provided with a pair of shears and a pot of flour paste, cutting and snipping, folding and creasing, painting and pasting, as they put these paper creations together. Some of the more elaborate pieces, such as the long robes, come already manufactured, from Canton, China, but most of the articles are made by the Chinese paper workers in San Francisco. No patterns or stencils are used, just the sense of color and form, guided by skillful hands. The stock of paper articles carried by this house runs well up into the thousands in value, and they are also shipped to dealers all through the United States and into British Columbia.

Here also are made simple figures cut out by hand, as American children do paper dolls, all to be burned for the edification and appeasing of the great joss, for the use of departed friends, or by the eldest son of a Chinese household, who believes that unless he burns, at the worship of the tombs, which comes just after the Chinese New Year and lasts for a month or so, representations in paper of the things his father needs and uses in his life, his father, when he reaches the other world, will find himself reduced to beggary and without these things. Much gilt money, made in the paper shops in Canton, is also burned. When a Chinaman takes a voyage, he throws quantities of this money overboard to propitiate the God of the Sea. If the paper burned has characters upon it, it will be more efficacious, and if it be red, it is the fortunate color. Every Chinese household has a great respect for paper having characters upon it, and every scrap of it found is kept and solemnly burned. For this they believe much credit will be given in the other world, as well as here. In China the benevolent societies employ an old man with a pair of big chopsticks to pick up scraps of paper from the roads and out of crevices, etc., and burn them. His calling is considered a most honorable one.

These shops make many things to be burned at Ta Tsiou, the feast of music, to avert damage from fire. One million dollars' worth of these paper articles is burned every year in China. From these shops also come the blue and white paper used in mourning, and the perforated paper thrown out at funerals, that the devils may crawl through it, and so lose track of the soul of the departed one. But at the Chinese New Year, beginning about February 1st, the paper factories are at the zenith of their business. Every Chinaman, high and low alike, has scoured his house, and is ready to burn paper before the joss. On the river boats, where so many of the lower class live, the head of the house puts up a new joss picture, and will fool it if he can. For he will sometimes burn a gorgeous robe such as officials wear, thinking thereby to attain such a station in the eyes of the joss, and pass on the honor to members of his family.

Along the back wall of the little shop are hung paper trunks with rich robes of paper, sometimes studded with small them. A grotesque cap or head-dress of paper, sometimes studded with small mirrors in the place of jewels, and a boatlike pair of paper shoes complete the package, to be burned on New Year's Eve or later, before the joss. The trunks are supposed to be used by the gods in various trips. Special suits of this paper clothing, varying much in decoration and cost, are made for the different josses. The "coat of the seven

sisters" is a long, richly decorated affair, sometimes with brass rings let in the body as a sort of insertion or embroidery. A little flopping woman, a melange of shiny black hair, glazed cloth and twinkling jade ornaments, waddles into the shop and asks shyly for a "suit for the seven sisters." At once the dealer knows that she is going to send up burnt offerings and thanks to one of the favorite women josses.

Thousands of years ago there was a Chinese god who had seven daughters who never married, but the memory of their virtuous lives remains among the Chinese women to this day. The Chinese believe that the constellation familiar to Christendom as the "Dipper"is the jewels of the seven sisters. This joss is believed to be one of the daughters of the ancient god, and the Chinese girls and women worship her with especial veneration and love, because, as the Chinese will tell you, "the seven sisters all very honest, good girls." In China the 7th of July is the feast day of the seven sisters. At 8 o'clock on the evening of that day all the girls of a neighborhood get together and vie with one another in showing who can contribute the richest offerings for the joss of the seven sisters.

From these paper emporiums are sold hundreds of robes and the tiniest of red and green and gold paper slippers for Quon Yum, Queen of Heaven, the famous little foot woman joss. She also has a special day set apart for further offerings to her, the 29th of January, according to Chinese reckoning.

The most frequent demand upon the paper dealer at New Year's runs in the following hieroglyphics: "Nor my Quon Dai Yee," which, being interpreted, means: "I want a suit for Quon Dai Yee." This is the grand mogul among the josses, and his powers and jurisdiction are wide. Everything that can possibly contribute to his comfort is burned at the New Year feast. Gorgeous fans with lucky sentences written on them, and paper water pipes, smothered in tinsel, blaze up before him in reckless profusion from bronze receptacles. Demands for paper boats smothered in cargoes of flowers to be burned to Buck Dai, the river joss, are also frequent. Paper pictures, huge pyramids of paper flowers in which are set punks overtopped by peacock feathers, and paper mottoes which are supposed to keep out the demon of the plague, are also good sellers. These things may be bought at figures all the way from 15 and 25 cents to $1 or $2.

The paper suits and trunks range in price from 50 cents per set to $2.50 or more, and in China on July 14th, which is the feast day of all josses, silken robes costing as much as $10 are sometimes burned by the richest devotees. In San Francisco even the poorest Chinese family will hoard pennies in order to be able to burn a robe costing at least 50 cents, and thereby gain good luck throughout the year. Among the smaller articles made in these paper factories are the figures in long strings which represent the servants, who, as they are burned, are supposed to descend, and be at the beck and call of people in the other world. If the deceased was a soldier, spears, armor and all the paraphernalia of a warrior are burned for him. Also are burned paper horses to ride, fishes to eat, clothes to wear and pipes to smoke, etc. Here in these shops are printed and sold long letters of supplication from the sick, to be burned before the joss, who may thereby grant the petitioners health.

One side of the store is occupied by a stock of marriage dolls, gayly dressed figures standing in boxes of flowers and surrounded by punk. No marriage ceremony is complete, nor will the union be fruitful, according to the Chinese, without a number of these dolls among the wedding decorations. Other dolls for sale are quaint and grotesque "pictures," as the Chinese call them, used for simple household decoration.

From the ceiling of the shop hang the wonderfully made pyramids of the Loon

Hong, or hanging baskets made especially to hang in the temple before the joss. Nearby wave the shen fans, long streamers with hieroglyphic screeds emblazoned on them. These are carried before the joss in processions to announce his coming. Then there are paper flags of all sizes and colors.

These are supposed to be needed by the joss in giving orders to his servants, his army, etc., for with him flags are used to indicate orders, something after the custom in the American navy. New Year cards without end, plastered with enough good wishes to pave the city, are also made and sold in the paper shops. The American visiting these shops for the first time will find many other things queer and interesting.—Paper Trade Journal.

MILLS IN BRITISH INDIA.

Mills in India apparently are unable to check an increasing importation of paper and pasteboard, the total value in the year 1902-3 being £349,871, an addition of £94,766 during a period of five years. It is satisfactory, says the Paper Trade Record, to find that the British paper exporter monopolizes the market, supplying paper to the value of £171,338 in 1902-3, as compared with £134,619 in 1898-9.

Continental countries during recent years have sent increased quantities of the cheaper qualities of paper to British India, Austria-Hungary and Germany in particular having cultivated the market with some activity. In 1902-3 the imports into India from the United Kingdom amounted to nearly 49 per cent. of the total value from all sources, a position not quite so strong as five years ago, when the percentage was not far short of 53.

As previously stated, the imports from the United Kingdom during 1902-3 were of the value of £171,338, and for comparative purposes it may be mentioned that during the same period the receipts from Austria-Hungary were returned at £88,352; Germany, £45,074; Belgium, £28,484; Italy, £4,831; Straits Settlements, £3,227; Sweden, £2,291; Holland, £1,810; China (Treaty ports), £1,328; Hong Kong, £1,316; United States, £583; Japan, £527; France, £182, and Norway, £140.

The exports of paper and pasteboard in 1902-3 from British India amounted to £6,200, of which £2,071 worth went to Ceylon. In addition to the imports of paper and pasteboard into British India, the receipts of stationery in 1902-3 amounted to £223,431, of which total the United Kingdom was responsible for £167,425.

"NEW" PAPER MAKING FIBRES.

There is considerable talk nowadays about the discovery of "new" fibres for use in paper making, but for the most part it is a revival of a discussion of old fibres that have been tried years ago and found not to meet paper making requirements.

For instance, there is the cornstalk. It was used years ago as a paper making stock, both in this country and abroad, but it was given up as not being as available as other fibres.

Bagasse is not new. It was used in Philadelphia very many years ago, and has also been used elsewhere. There are now in the South two mills the construction of which was based on bagasse as stock.

Cottonseed fibre is old as a paper making material, but it has not come into general use.

Palmetto makes excellent paper, but it possesses disadvantages that keep it without the realm of paper making.

Peat has been experimented with, and at times some boards are made of it, but it is not yet installed as a successor of spruce and poplar, and probably never will be notwithstanding some efforts to bring it to the front.

In fact, nearly all the fibres now talked of and investigated are well known to experts in the paper making line, and the talk as to their working a revolution in the trade is pure moon-

shine. That they may be used to a larger extent than they have been is not denied, for the experimenting now going on may lead to new and improved methods that may make up for some of the present shortcomings.

Besides the fact that it can be converted into paper, there are other features that a fibre must possess in order to be attractive, or even available for the paper maker. It must exist in large enough quantity to insure a steady, unfailing supply, and it must be so located that it can be taken to the paper mill and converted into paper without excessive charges for haulage or for conversion. Most of the fibres talked of do not at present possess all these advantages.—Paper Trade Journal, New York.

PAPER AND PULP YARNS.

Prof. E. Pfuhl, of Riga, Russia, has published a work that relates to the development and progress and present state of a new industry. The description of various processes is based upon personal experience in a new branch that is apparently destined to open a road by which the paper industry can enter the textile industry. Hitherto the paper mill has turned the refuse and waste of the spinning and weaving mill into its finest products, but in future part of the same refuse will find its way back through the beater and Fourdrinier to the spindle and loom. The weaver may have to study the art of paper making, while the paper maker will become accomplished in the art of spinning and weaving. The writer of this interesting book describes the adaptability to the spinning process of a great variety of fibre stock used in paper making. Every class of paper fibre is available in this new fibre spinning industry.

The most important factor is sulphite; the spinning process has been entirely changed through the finding of a new way to spin short fibres in the wet state.

There is described the old process of Clavier for producing threads by twisting paper slips around cotton threads in forming the weft of cloth for making towellings, serge and other fabrics for summer suits, or around wool yarn for winter garments. The cloth is washable. The paper threads are called xylolin. However, the author finds that owing to the newly invented silvalin and other processes the xylolin cannot stand competition, the ready-made paper being too expensive and the process too slow.

The progress of the new industry seems to depend upon the processes patented to Kellner, Tuerk, Leinveber and Kron, senior and junior. The latter call their product silvalin, a name already widely known.

In the first stage of their process these inventors adopt the same principle by refining the raw material—sulphite by preference—in beaters, freeing the same from knots, splint, sand, metallic parts and other impurities by straining, and then flowing this liquid pulp mixture on a moving wire cloth for the purpose of forming a finely felted web to be directly transformed by various means into threads in the wet or dampened state. After this stage in the transformation into threads these inventors adopt different methods. The writer first considers the patents of Dr. Carl Kellner and of Gustave Tuerk. According to the first, the twisting and rounding of the threads from the felted material takes place on the wire itself, while the latter inventor forms the fibre strips coming from the wire on a separate apparatus by pressing, rubbing, and twisting them into threads. The fibre bands or strips are shaped in a series of grooves in metallic strips, fastened around the circumference of the wire cylinder. The bands are taken from the wire by a felt apron and carried to a coucher for pressing and tightening, and for the absorption of water. Thence they are carried to a rubbing device, which consists of a double endless rubber apron moving on rollers in the direction of the wire

cylinder, and receiving also a sidewise motion produced by an eccentric. These lengthwise and sidewise reciprocating motions cause the rolling of the pulp bands into round threads of greatly increased adhesive strength. These threads are now twisted and collected on spools, or they are loosely gathered in revolving tin cans to be carried to the twisting machines.

The Altdamm Patentspinnerei is the owner of the Kellner and Tuerk processes. The company is experimenting in an effort to increase the producing capacity of the Tuerk system.

The company's goods were exhibited in the Düsseldorf exhibition in 1902, and were greatly admired in trade circles; it is acknowledged that they can even compete with certain products made of the better grades of cotton.

The speed obtainable in the operation of the rubbing work, however, is limited to from 40 to 50 feet per minute, and the maximum output to from 80 to 400 kilogs. in twenty-four hours.

Kron's invention, the silvalin process, deserves the greatest consideration. The use of the Fourdrinier machine has been made practicable in place of the rather too slow cylinder, and the output obtained has been largely increased. The web is divided on the wire behind the suction box into numerous strips numbering about 300. This is accomplished by means of a dividing instrument, consisting of a peculiarly constructed pipe provided with perforations through which jets of water or air are forced against the web, causing its partition into strips. The web, thus divided, is carried on the wire to the first press, thence to the second press, provided with a steam heated cylinder, where the water contents of the pulp are reduced to 40 or maybe 30 per cent. of the dry weight. In this condition the bands are wound into collecting rolls, and after cores are removed these rolls are divided into smaller ones and stored in a dampened vessel to await their later treatment on a twisting machine. A machine of this description, about 70 inches in width of wire, supplies bands for making 6,000 pounds of No. 3 threads in twenty-four hours. The wire travels from 150 to 200 feet per minute, and there is no reason why this should not be increased.

The production of different sizes of threads is regulated by the thickness of the web on the wire, and also by the width of the bands. By changing the dividing apparatus so as to increase or decrease the size and number of the strips, their width ranging from 5.7 to 9 millimetres, threads from No. 1½ to No. 12 can be produced.

Testing all pure cellulose threads under normal conditions, a strength of from 5.5 to 7 kilogs., with a stretch of from 6 to 7 per cent. is attained. A test of silvalin has resulted in showing the strength of from 4.10 to 8.31 kilogs.

A silvalin mill in Holland, equipped with 2,300 spindles and sixty looms, has a daily production of 7,000 kilogs. of cloth.—Paper Makers' Journal.

CHANGES IN AUSTRALIAN TARIFF.

Changes and additions have recently been made to the Australian tariff, and among them may be found the following items of interest to various branches of the paper and allied trades, viz.:

Wrappers, vegetable parchment, with advertisements printed thereon, 6 cents per pound.

Felts for use in connection with paper making machinery, free.

Matrices for linotype composing machines, free.

Chopped tissue paper, 15 per cent. ad valorem.

Straw board, manufactured into bottle envelopes, etc., 25 per cent. ad valorem.

Straw board, sanded, in sheets, 24 cents per cwt.

Paper used in packing oil cloth and linoleum, 15 per cent. ad valorem.

Envelopes, advertising, 25 per cent. as envelopes, or 6 cents per pound as advertising matter, whichever will yield the higher rate.

Fancy lace paper for box making, 25 per cent. ad valorem.

Bookbinders' sewing machines, 20 per cent. ad valorem.

Paper, bronze, watered, is surface coated, and as such may be imported free.

Paper pressings, 15 per cent. ad valorem.

Paper, blackboard, 15 per cent. ad valorem.

Paper, oil sheets, 15 per cent. ad valorem.

Lithographic machines and presses, free.

REMARKABLE PAPER.

Perhaps the most remarkable of all the papers which find a common use in the Japanese households are (says the Liverpool Daily Post) the leather papers of which the tobacco pouches and pipe cases are made. They are almost as tough as French kid, so translucent that one can nearly see through them, and as pliable and soft as calf skin. The material of which they are made is as thick as cardboard, but as flexible as kid. The British paper-maker and stationer is years behind the times, or he would long ago have familiarized us here with similar products, importing them from Japan if he really cannot make them.

PULP IN BRITISH COLUMBIA.

Considerable interest in the manufacture of paper and pulp is now manifest in British Columbia. Two companies which have been in existence for some time, and which have control of large water powers and of considerable areas of timber-bearing lands, are making some progress toward the erection of mills, and two companies recently chartered are also showing considerable activity. It has been well known for some years that British Columbia offered exceptionally good natural advantages for the establishment of a pulp and paper industry, but the territory is so far afield that it has been difficult to enlist attention of capitalists. Moreover, there is not much of a home market in the Province for either pulp or paper. It is obvious that most of the pulp or paper manufactured in that Province must find a market either on the Pacific Coast of the United States, or else in Australia, China and Japan, and the South American coast. The Pacific Coast States consume a good deal of paper, but the demand is readily supplied now at prices with which British Columbia could not compete with advantage, but the Trans-Pacific trade should offer a good opportunity, inasmuch as deliveries could be made much more quickly from the western coast of North America to Australian, Chinese or Japanese ports than from the Atlantic coast. Capitalists who contemplate interesting themselves in paper and pulp in British Columbia, however, should bear in mind that the Province is practically a virgin territory in so far as this industry is concerned, and that everything must be created from the ground up, not only the plant, but the methods of doing business, the business sentiment, etc., and that a company which undertakes to build a mill must be very strongly fortified in the way of capital, ability and experience in order to take the fullest advantage of the favorable natural conditions.—The Paper Mill, New York.

NEW SULPHUROUS ACID PROCESS.

A new process for making the acid used in sulphite mills has been patented by Paul Drewsen, of New York, and John Parent, of Shawano, Wis., and for some time past has been in practical operation at the mill of the Wolf River Paper and Fibre Company, Shawano, Wis., U.S.A., in which Mr. Parent is engaged. The process is so simple, and does away with so much expense in first cost and subsequent maintenance

that competent sulphite men who have examined it say it will simply revolutionize present acid-making methods. The apparatus consists simply of a wooden box of size suitable for the amount of acid to be made, provided on the bottom at frequent intervals with agitators. The milk of lime enters the box at one end, and the sulphur gases at the other. The agitators make between 400 and 500 revolutions, and produce a very violent commotion in the liquid, throwing it up against the top of the box, and offering a great absorption surface for the gases to reach. From five to ten minutes' treatment is all that is required, and the acid flows in a continuous stream out of the box. The process is in every way continuous and automatic. When the machinery stops, the flow of liquor stops, and no milk of lime can run into the acid. There is also no chance for the settling of lime and monosulphite of lime. There are no pressure or vacuum pumps, no large tanks, very little power, and no expensive help. A company, known as the Drewsen-Parent Construction Company has been formed to exploit the new invention. Paul Drewsen, of New York, is president; John Parent, of Shawano, vice-president; and F. E. Luke, of Shawano, secretary-treasurer and manager.

THE CANADIAN PULP PRODUCTION.

Mr. George Johnson, Dominion Statistician, furnishes the following particulars of the pulp production in 1903:

The wood pulp industry of Canada for the calendar year 1903 was carried on by 39 mills, which had an output of 275,619 tons of wood pulp. Of this quantity, 187,871 tons were mechanical pulp, 84,808 sulphite, and 2,940 soda. The corresponding quantities for 1902 were: Mechanical, 155,210 tons; sulphite, 76,735 tons, and soda, 9,044 tons. This shows an increase of 34,630 tons in 1903. The increase is distributed: Sulphite, 8,073; mechanical, 32,661 tons; soda showing a decrease of 6,104 tons. The total value of the output of 1903 was $5,219,892. There are several large mills in course of construction, or which, being finished, did not operate during the year 1903. Two or three firms have gone out of business, or manufacture only paper where before they made pulp.

Nine of the thirty-nine mills manufacture sulphite pulp and three soda pulp. Twenty-seven manufacture mechanical pulp, and five make both chemical and mechanical. Taking the returns of thirty-nine mills, the average time the mills ran during the year was nearly nine months. The value of the production was $5,219,892, the amount exported $3,013,441, leaving $2,206,451 for home use. In a general way, therefore, we export about 57 per cent. of our production. Of the $3,013,441 worth exported by Canada in 1903, Great Britain took $865,826, the United States $1,890,448, and other countries $248,107.

MATERIAL USED IN MAKING NOTE PAPER.

It is not a pleasant thought that the brilliant white note paper which your hand rests upon may have in it the fibres from the filthy garment of some Egyptian fellah after it has passed through all the stages of decay until it is saved by a rag-picker from the gutter of an Egyptian town, and yet it is a fact that hundreds of tons of Egyptian rags are exported every year to America to supply our paper mills. At Manheim, on the Rhine, the American importers have their ragpicking houses, where the rags are collected from all over Europe, the disease-infected Levant not excepted, and where women and children, too poor to earn a better living, work day after day, with wet sponges tied over their mouths, sorting these filthy scraps for shipment to New York. Our best papers are made of these rags and our common ones of wood pulp, which is obtained by grinding and

macerating huge blocks from some of our soft-wooded forest trees.—National Geographic Magazine.

PULP AND PAPER FROM CATALPA.

The July number of Arboriculture, published at Connersville, Ind., is printed on paper made from catalpa wood. The paper was made at the Cumberland Mills, Maine, and an average of 43 per cent. fibre, dry weight, was obtained as compared with 46 per cent. obtained from poplar. It took a somewhat larger amount of caustic to reduce the wood and about twelve pounds of chlorine per 100 to bleach it, as against eight pounds for poplar. The yield is somewhat less than poplar and the cost of reduction somewhat greater, but the fibre is short and fine, and makes good, strong paper without much beating. It is very much like basswood fibre.

Catalpa has many other uses besides its availability for pulp. It is said to be the most enduring wood on the continent, and is used largely for telegraph poles and railway ties. It is one of the most rapidly growing trees, and is adapted to almost all climates.

CHEMICAL REAGENTS FOR MECHANICAL WOOD PULP.

The phloroglucinol-hydrochloric acid test for mechanical wood pulp cannot be used with papers which are colored with metanil yellow, because the free mineral acid causes an intense violet coloration of the dye stuff. Dimethyl-*p*-phenylenediamine and the corresponding trimethyl and tetramethyl derivatives are most unstable compounds. They yield unstable dye stuffs very readily under the action of oxidizing agents, and are very delicate tests for the presence of ozone in the air. These dye stuffs are peroxides; they are readily converted back into the original basis by reducing agents and partially by alkalis. All peroxides, as well as free chlorine, bromine, and iodine, produce a red coloration with the "dimethyl" reagent.

Hence, if paper contain free chlorine, a red reaction will be obtained, even in the absence of mechanical wood pulp. A similar coloration will be obtained if the paper contain manganese dioxide (for grey tones) or ferric hydroxide (buff) in a soluble form; organic peroxides also give this coloration, but these are not likely to be found in paper. The red coloration in presence of mechanical wood pulp with the "dimethyl" reagent appears after one minute, and dries to a deep orange; if a drop of water be then applied, the carmine red reappears.

If the paper contain metanil yellow, a violet-red coloration is developed in about ten minutes; if the red spot be moistened with water the original metanil yellow color is restored; with glacial acetic acid violet-red colorations may be produced, but disappear on the addition of water. If the paper contain free chlorine a different red coloration will be produced with the "dimethyl" reagent; on touching with ammonia this red color is discharged, and does not appear on subsequent acidification with glacial acetic acid. The red coloration due to wood, however, after it has been discharged by a drop of ammonia, is restored by glacial acetic acid.—C. Wurster, in Papier Zeitung.

—The striking paper makers in Appleton, Wis., claim that the laws have been broken by mill proprietors in importing paper makers from Canada.

—The Tabard Inn Corporation has a capital stock of $12,500,000. The company is a consolidation of the Booklovers' Library, Philadelphia Bookstore Company, Library Publishing Company and the Tabard Inn Corporation. The officers are: President, Seymour Eaton; secretary, John E. Bryant, and treasurer, Frederick W. Steirs.

PULP SHOULD BE MADE INTO PAPER.

Lord Strathcona, Canadian High Commissioner, in London, says, in his annual report, for the year ending with June:

So far as wood pulp is concerned, the Canadian trade with this side during the year has not been a satisfactory one, for reasons that are too well known to need recapitulation. With respect to the paper trade, the following remarks by an importer who has long been connected with Canadian interests, may be useful reading:

"There has been no increase, but rather a decrease in the amount of news of Canadian make used in Great Britain, and this in spite of the considerable increase in consumption. It is to be greatly regretted for Canada's sake that people who have suitable timber limits and water power confine themselves to the manufacture of pulp at little or no profit to themselves, as is only too apparent by the recent closing of pulp mills. Given a suitable location, there can be no doubt whatever that if only interested parties would make the necessary further capital outlay and manufacture paper instead of pulp, they could reap a reasonable profit and steady trade. I am certain that Canada cannot reap the full benefit from her pulpwood resources until she carries out the full manufacture of the raw material into paper.

"To make pulp alone, either ground wood or sulphite, or even both, at the same mill, will not pay so good a return on the capital expenditure as the complete manufacture of paper would do. This is certainly borne out by facts, for whereas, during the past year two or three pulp mills have closed, more than one of the mills making paper have added to their capacity, one well-known mill having practically doubled its plant. As regards the market here, there is good opening for at least twice the quantity of news Canada is now sending over. English mills are refusing orders, and the Scandinavian mills are kept well employed by orders from this market, while the consumption of news is steadily increasing. So that I am convinced that there is ample scope for further developments in this direction at remunerative prices."

In an appendix, the High Commissioner shows the increase in Britain's imports of pulp of all kinds from all quarters. They aggregate as follows:

	Tons.	
In 1901	448,455	$2,406,084
In 1902	525,799	2,398,215
In 1903	576,003	2,505,663

DEATH IN THE VISITING CARD.

The Paris correspondent of a London evening paper states that a collector of the visiting cards of illustrious persons has just made a curious discovery. In his collection are three cards of the late Emperor Napoleon III., which, though dating from the early part of 1868, are still as white and clean looking as when they were new, although a number of much later cards are faded and yellow. The collector had the curiosity to make enquiries into the circumstances, and learned that these three cards were prepared with a special glaze which had a basis of arsenic in its composition.

An old soldier had received one of them, and so fervent was his admiration of the Emperor that he carried it frequently to his lips. He became very ill in consequence, and the Emperor was told of his mishap. The next year's cards were not so white, but they were not so dangerous, either.

—Japanese soldiers carry with them kettles made of thin paper, the invention of one Daiju. The kettle upon being filled with water and the outside surface dampened is hung over the fire; in ten minutes the water is boiling. A kettle costs only two cents, and can be used eight or ten times.

PULP AND PAPER IN BRITISH COLUMBIA.

The pulp and paper field in the mountain Province is being rapidly entered. The local Government has offered liberal inducements to the industry, and these are being taken advantage of by several companies.

The Oriental Pulp and Power Co. has received a concession of 83,200 acres on Princess Royal Island and vicinity, and has erected extensive works at Swanson Bay. The timber is all spruce, and of good quality.

The Island Power Co., incorporated last May, has been granted a reserve from which to select lands as follows: Port Neville, 20 square miles; near Chatham Point, 6 square miles; Beaver Inlet, 9 square miles; McBride's Bay, 9 square miles; Phillip's Arm, 8 square miles; Upper Campbell Lake, 36 square miles; Buttles Lake, 20 square miles.

The Bella Coola Development Co. has secured about 20,000 acres in the vicinity of the proposed mills. This company also was incorporated in May.

The Quatsino Pulp and Power Co., of Quatsino Sound, has a contract that calls for the operation of the plant to begin within a year. The company controls 100 square miles of pulp and timber lands between Quatsino Sound and Broughton Straits. Contracts have been let for the construction of wharves, sawmills, pulp mills, etc. As soon as business warrants, a paper mill will be erected to use the entire output of the pulp mill, which is to be 125 tons daily. The company has a capital of $500,000, and the initial expenditure will be $150,000.

The Pacific Coast Wood Pulp and Paper Co. is being floated financially in England. The company has done considerable pioneer work, and has practically absorbed the Pacific Coast Power Co. and the Industrial Power Co., both of British Columbia. The mills of the new company are to be located at the mouth of Powell river, eighty miles north of Vancouver.

THE PROBLEM OF STRAW BOARD WASTE.

Prof. Sackett, of Earlham College, Richmond, Ind., will soon publish the results of an investigation made by the United States Geological Survey as to all the facts connected with pollution by strawboard waste or refuse. They find that the principal factories in the United States are confined to a comparatively small area. Indiana, Ohio and Illinois make 83 per cent. of the board produced in the United States, and Indiana alone produces nearly 50 per cent. of the total. After these three leaders New York, Maryland and Michigan rank next in order of production. The census record of 1900 shows that there are fifty-nine strawboard factories in the country, which use 157,534 tons of raw material to make a finished product valued at $3,187,342.

Strawboard waste is an extremely staple substance which does not degenerate when kept in clean containers, but when mixed with substances of a putrescible nature, such as sewage and other organic matter in streams, it becomes extremely foul and objectionable. The waste liquors from the mills are ordinarily discharged into neighboring streams. The result depends upon the character and volume of the water in the stream.

As many Indiana rivers flow over limestone beds, their water is hard, carrying 15 to 20 grains of lime to the gallon. The waste liquor from a strawboard mill where wash water is not plentiful sometimes contains 200 or more grains of lime to the gallon. In order to reduce the quantity to 40 grains a gallon, the minimum stream flow would have to be about ten times the volume of water employed in the manufacturing process. This limits the number of streams upon which such mills can be operated in the present manner without nuisance to a few rivers in each State.

Various remedies have been tried by manufacturers to cure the evil. Some

have run the waste into a series of beds, scooped out of a gravel bottom land. Here the straw and lime slowly settle, while the water filters through the subsoil and eventually finds its way to the neighboring creek. But the great quantity of straw wasted soon clogs such natural filters, and dependence is placed upon high water to wash the refuse out of the beds. It is then deposited on other lands below, so that this method is only a makeshift. What a carefully constructed settling and filtering plant may accomplish has not yet been absolutely determined, although the American Strawboard Company made experiments in that line during the summer of 1903.

The experiments of the Geological Survey have demonstrated that there are two possible methods of purifying the waste—filtration and chemical precipitation. Simple sedimentation is not effective. Neither is simple filtration, but this, when combined with chemical precipitation, is an aid to the process. Chemical precipitation appears to be entirely effective, and is satisfactory in every respect except that of cost.

The most effective chemical precipitants for purifying strawboard waste are the sulphates of iron and alumina, but they must be used in such large quantities that they make the cost of the process prohibitive. Neither lime nor carbon dioxide is of value as a precipitant, but a combination of carbon dioxide and milk of lime is effective when properly applied.

The process can be economically maintained if conditions are favorable, and it will secure the removal of 75 per cent of the suspended material. Higher efficiencies can be obtained by slower rates of operation and by the use of sand filtration, which would be necessary, however, only in extreme cases.—Paper Trade.

The Price-Porritt Pulp and Paper Co., of Rimouski, Que., has shipped a quantity of pulp to Becker & Co. this year, 1,800 tons going in one steamer.

Mill Matters

It is said that the Booth mill has been shipping pulp to the International Paper Co.

The Jonquiere mill has one machine and is making boards for export. The Laurentide Co. are selling agents in England.

The Barber-Ellis Company, whose works were destroyed in the Toronto conflagration of last April, and which afterward removed to Brantford, have now four envelope machines at work there.

The Ouiatchouan Pulp Co. are grinding to full capacity, but are not shipping. They shipped 1,000 tons in the spring, but the price was not satisfactory, and they now have upward of 1,000 tons of wet pulp stored till the fall.

The Chicoutimi Pulp Co. is making upwards of 160 tons of dry pulp every twenty-four hours. This has been their average for the past two months. All the output so far this season has gone to Becker & Co., London, eight cargoes having been shipped.

The Spanish River Pulp and Paper Co. have taken the construction of their dam out of the contractor's hands, as intimated last month. The board has not decided whether to go ahead with the work itself or to advertise for tenders. In any case, it is intended to have the dam complete by the spring.

The shortage of supplies at the Sault pulp mill, owing to the suspension of operations during last season's cut, is to be made up by purchase of pulpwood from the Spanish River Company. It is said that negotiations are now on for the purchase of 13,000 cords piled at Spanish River. The question of a company selling wood from a Government concession, has been raised, but as long as the material is manufactured in Canada there is nothing in the Government agreement to prevent sale.

The Laurentide Paper Co. are very busy; they have seven machines running, five on news, and two on boards. The bulk of their trade is export. The company has just closed a three years' contract to supply the Toronto Globe, which has till now been supplied from the Eddy mills.

A despatch from St. John's states that Sir Alfred Harmsworth and a number of newspaper proprietors of London have just closed negotiations for 1,500 square miles of timber areas in the interior of Newfoundland, on which they propose to erect the largest pulp mill in the world.

The Peribonka Pulp Co. owns its tug and barges, and tows its product across Lake St. John to the railway at Roberval. The company has about 1,500 tons of wet pulp stored, awaiting better prices. The present intention is to enlarge the mill very materially, as incidental expenses would be very little greater for double capacity than they are at present.

The Belgo-Canadian Pulp Co., of Shawinigan, is now known as the Belgo Pulp and Paper Co. It is at present running one machine of news for export. The other machine is nearly finished. The firm is still making pulp on all grinders for export. Mr. Biermans has left for Europe to induce the directors to put in two more paper machines. If he succeeds in this, the mill will use practically all its own pulp.

On August 12th, a disastrous explosion took place at St. Catharines, wrecking a large section of the Kinleith Paper Co.'s mill. One of two rotary rag boilers blew up, and destroyed the three-story building in which it was situated. The other boiler was blown into the canal. The cause of the explosion is unknown as yet. The property loss is estimated at about $15,000, but fortunately there was no loss of life. Operations on one machine will be suspended indefinitely.

The injunction of the Jonquiere Pulp Co. to restrain the Chicoutimi Co. from diverting the waters of Lake Kenogami has been upheld by the Superior Court.

It is said that the first fourteen miles of the Nepigon Railroad will be pushed forward this fall, and this will give the Nepigon Pulp and Paper Co. railway access to the site of their mill, thus permitting building operations to commence immediately.

The report published in these columns last month to the effect that the "Soo" pulp mill would manufacture wet pulp, is found to be incorrect. President Warren says the mill has been making nothing but dry pulp for some years, and it is not the intention to make anything but dry pulp. The entire output is sold for a considerable time ahead.

W. J. Finlay has rebuilt his paper mill at Strathcona, Ont., which was destroyed by fire last October. The main building is 30 by 105 feet, the walls being of stone masonry, the floors concrete and the roof galvanized steel. It is as nearly fireproof as it can be made. The adjoining building is 32 by 114 feet, and contains the paper making machine, which is of the 72-inch size. This building is likewise of fireproof construction. The boiler house is 30 by 55 feet, and contains two steam boilers of 250 horse-power each. The output is sold a year ahead.

The Riordon mill, at Merritton, has a full complement of men at work. Old employees are being taken on as fast as openings present themselves, but the mill is distinctly an open mill, and will remain so. Things are very quiet at present. A small riot occurred a few weeks ago, but six or seven of the participants are under bonds to appear for trial in September, and no further trouble has been had. For some time men were boarded and lodged in the mill, but now they are finding lodgings in the town. The strike occurred on the first of May and was a demand for recognition of the union.

W. Godson, formerly proprietor of the Leduc Record, is starting a new paper in Strathcona, Alta, to be called the Chronicle.

The Dominion Parliament has voted $60,000 for a wharf at Seven Islands, Quebec. A pulp mill is to be erected at this point by the North Shore Power, Railway and Navigation Co., and the harbor improvement will be of material assistance to this enterprise.

Work on J. R. Booth's paper mill will begin shortly. Contracts for the machinery have been let, delivery to be made in the fall. Ottawa has granted permission to Mr. Booth to build a tunnel under Bridge street, to connect the pulp mill with the paper mill.

The time limit for power development by the Backus syndicate, at Fort Frances, has been extended from May 1st, 1906, to January 1st, 1907, with a forfeit of $25,000 in case of failure to carry out the agreement. Work is progressing on the power plant; it is reported that 10,000 barrels of cement are now on the ground. The town was visited recently by Hon. Clifford Sifton, who viewed the sites of the proposed pulp mill and flour mill, and considered the prospects very bright for the town becoming a manufacturing centre.

—The Crown Lands Department of Quebec has a proposition under consideration to increase the number of fire rangers at no cost to the limit holders, but limit holders to pay the whole cost of extra forces brought in in case of fire. The department called a meeting of limit holders to ascertain their views before taking action. The latter are in favor of increased protection, but do not agree with the proposed distribution of costs.

THE NEW CORNWALL MILL.

The Cornwall Paper Manufacturing Co. recently elected directors as follows: President, M. P. Davis, Ottawa; vice-president and managing director. S. Greenwood; directors, Col. R. R. McLennan, R. J. Pitts, J. A. Cameron, C. P. Derochie, E. H. Brown. The company's mill is rapidly approaching completion. The buildings are completed, and some of the machinery installed. It is hoped that the mill will be in operation before the first of October.

The following is a description of the paper machine, which is built by Bentley & Jackson, Bury, Eng.: It will make a sheet 120 inches wide. The machine has horizontal stuff chests, built of cement; three "Wandel" strainers of the firm's latest type; one wire frame to take 60-ft. wire, with Smith's suspension links and Seddon's shake regulator; all the rolls of large diameter—breast roll, 16 inches; guide roll, 9 inches; stretch rolls, 7 inches; all of bored and turned cast brass; tube rolls, 4 inches and 4½ inches diameter, the deckles of improved construction, arranged for narrowing or widening, whilst the machine is running; the couch rolls each 20 inches diameter, of brass; first press rolls and second press rolls 20 inches diameter (both top and bottom rolls), of brass and rubber; leading rolls have steel ball bearings; wet felt rolls of ample diameter; one leading cylinder, 3 feet diameter; 18 drying cylinders, each 5 feet diameter, all bored through and buffed, carried in firm's improved turned circular framing, and all fitted with self-oiling pedestals, self-weighting travelling doctors; steel felt rolls, with all guiding and stretching fixings; two finishing calenders, each prepared to take seven rolls, each roll fitted with self-weighting doctors; improved ripping apparatus and turnover reel combined, driven by "Marshall" gears, with pulleys of large diameters, self-oiling bearings throughout, each drive fitted with friction clutch of the best type; one pair of inverted, enclosed, self-lubricating steam engines for high-speed running, giving a variation in speed of the machine of 10 to 1, viz.,

say, 50 feet to 500 feet, without any alteration of the gearing, all the variation being obtained from the steam engine alone; a vertical steam engine also provided for driving the wet end of the machine, the whole of the gearing protected with pillars and polished rails, staircases, hand-rails, and platform at the back of the machine; also a platform in front of the machine, cylinders for feeding through.

PAPER TRADE IN WESTERN CANADA.

A correspondent of the Pulp and Paper Magazine, returning from Winnipeg, says trade in almost every line of business is very brisk—the word boom may fairly be used. There are very few towns and villages in any part of Manitoba or the North-West that do not show this year an increase in population, and an improvement in stores and public buildings. Winnipeg, as the chief gateway to the business of the West, is advancing at a striking rate. It has doubled in population in the past ten years, the number of its inhabitants being estimated at about 70,000, exclusive of the floating population. The Winnipeg Exhibition this year was a revelation to visitors from Eastern Canada and the States. The exhibits of live stock and agricultural implements, as well as of grain and some classes of vegetables, have never been exceeded, even in Toronto. The paper and allied trades were, however, but poorly represented, the only exhibits in these lines being those of the E. B. Eddy Co. and J. C. Wilson & Co. The former company showed samples of building paper and the latter paper bags, counter rolls for stores, other wrappings and toilet papers. These two companies are apparently the only ones having large warehouses in Winnipeg. Our correspondent is of opinion that the paper manufacturers of Eastern Canada, in common with manufacturers and merchants in other lines of business, are not awake to what is transpiring there. Many predict that the population of Winnipeg ten years hence will equal the present population of Toronto, and that some other western towns will show a proportionate growth. The merchants and manufacturers of the United States are keen enough to realize the development that is now going on, and are getting a great deal of trade that might be in the hands of Canadian firms. The explanation is that many people in the East who remember the boom of 1880-82, are skeptical of the soundness of the prosperity of the West. At that time, however, the town of Winnipeg was ahead of the agricultural development of the country to the west of it. The case is different now. The interval of twenty years and more has shown that crops are more certain than was formerly supposed, while the increased cultivation of farm lands has undoubtedly decreased the risks from frost. The rapid increase in railway construction has opened up new districts for settlement under more favorable conditions for the settler, while immigrants now take in more money with them to start on. Trade is now more substantially based upon the proved capabilities of the country, and if the country depended upon grain-raising and live stock raising alone, the region lying between the eastern boundary of Manitoba and the foothills of the Rocky Mountains will be capable of maintaining a population of a hundred million souls. The consumption of paper, as of other commodities, will be very large, and the manufacturers of paper, stationery, etc., in Eastern Canada will have themselves to blame if they fail to get the share of trade which should fall to them.

RUST SPOTS ON CALENDER ROLLS.

Calender rolls are a constant source of worry to the paper maker, in particular the rust spots that make their appearance on new rolls. The greater the

care taken to polish them up on every opportunity the longer the trouble seems to last. After each attempt to remove them they appear again more pronounced than ever. How is it that rust spots do not form on rolls which have been some time in use? Simply because while in use they have become covered with a thin layer of adherent oxide which is permanent, and preserves the iron from further action. A writer in the Wochenblatt gives a recipe for artificially coating the rolls with this thin permanent rust film. In the mills the new bright metal surface is often smeared with tallow. This must be removed and the rolls put in a moist place, so supported that the metal surface is wholly free. After a few days the thin rust layer which has formed is rubbed well in all over the surface with a moist cloth. This operation is repeated three or four times, and completed by rubbing over with petroleum to remove dirt and dust particles. The rolls are now ready, and can be used straightway without causing further trouble. The operations may be hastened by using weak vinegar (one part of vinegar and three of water), and wiping with a cloth dipped in the liquid. The rust layer then forms in a few hours, and the operation can be repeated three or four times. In the course of a day a sufficiently thick layer of oxide has accumulated.

PERSONAL.

Arthur Beaudoin, a traveller for J. B. Rolland & Sons, of Montreal, has severed his connection with that firm after fourteen years on the road. He will now be one of the partners with E. S. de Carufel, of Plateau Street, Three Rivers, Que. The new firm will be known as E. S. de Carufel & Co., and will carry on both a wholesale and retail stationery trade.

Dr. Dawson, the King's printer ,at Ottawa, has applied for superannuation. Dr. Dawson has been in the service for many years and has contemplated retirement for some time. He is seventy-one years of age, and has been in his present office since 1891.

S. S. Cushman, vice-president of the E. B. Eddy Company, Hull, has been brought down from his summer home, at Norway Bay, very ill with typhoid fever.

Mr. Greaves, manager of S. Charles Phillips' trade publications, in London, is making a short tour of Canadian mills, as a guest of Mr. Becker. He and his wife arrived at Chicoutimi in Becker & Co.'s ship, "Nancy Lee."

Alexander Lumsden, ex-M.P.P., died at his home in Ottawa on August 5th. Mr. Lumsden was one of the most prominent lumbermen of the Ottawa valley. He was also head of the Lumsden Steamer Co., whose boats ply on Lake Temiskaming and the Upper Ottawa. He was first elected to the Ontario Legislature as one of the two members for Ottawa City at the Provincial general elections of 1898. He suffered defeat at the elections of May, 1892. Deceased was sixty-one years of age.

PULP MAKING AND SPRUCE.

According to Charles E. Oak, an authority on the condition of the forests of Maine, no alarm need be felt over the threatened devastation of the spruce by the pulp mills of the State and the loss of the paper making industry as well as the loss of the forests. The supply of spruce for pulp making," said Mr. Oak, "is diminishing on the Androscoggin, Kennebec and Penobscot rivers, but there are still 3,000,000 acres of good pulp wood at the headquarters of the St. John river. Spruce is preferred because it floats better than most other woods, and is, therefore, easier to drive on the rivers, and because it is handled more easily from the woods to the mill, but many other woods can be used. There is plenty of wood in the forests of Maine which can be used in

making pulp after the spruce gives out, and that will not be for some years."

"Next to those of agriculture the great products of Canada in the near future will be iron, steel, cement and pulp."—Senator Edwards.

—A train load of pulpwood, on the Quebec and Lake St. John Railway, recently ran away and was wrecked at Hedleyville, near Quebec. No lives were lost, though some of the crew were injured in jumping from the train. The loss to the company is estimated at $40,000.

—A postal convention, between Canada and Mexico, will go into effect on the 1st of September. By this convention the rate on letters will be lowered from 5 cents to 3 cents, and the rate on newspapers, when mailed from offices of publication, willl be half a cent per lb., instead of 8 cents per lb., as at present.

—The building at the corner of Church and Court street, Toronto, opposite the Pulp and Paper Magazine office, has been acquired by David Smith, of the late firm of Rolph, Smith & Co. Mr. Smith will start a lithographing establishment, W. R. Phillips & Co., printers, remaining as part occupants of the building.

—The special number of the Toronto Globe celebrating the 60th anniversary of its foundation, was probably the largest issue of a daily paper ever published in Canada. It required over three carloads of paper for the 80,000 copies of this issue. It should be noted that the paper used in this issue was all "made in Canada," the portions containing the half tones being the product of the Kinleith Paper Co., of St. Catharines.

—The American Conduit Co., makers of bitumenized fibre conduits for underground electrical works, are looking for a factory location in Canada. The company now has factories at Philadelphia, Chicago, and Los Angeles. The conduit is made of paper soaked in bitumen and rolled into a circular pipe.

—By an invention of C. T. Lee, of England, flax waste, rags, bagasse, etc., are treated for the manufacture of pulp for paper making, the manufacture of molded articles, etc., by boiling for three hours in a 3 per cent solution of the saccharate of lime, magnesia, etc. Bagasse may be boiled under pressure, when the product contains less lime than raw material and also a substance derived from the pith of the material which strengthens the product and renders it non-absorbent of moisture.

—Centuries ago Korea was famous for its paper industry, says an English exchange. Thousands of tons of grass paper were shipped from Korea to China. This was not used for writing purposes, but the leaves were steeped in oil, and the transparent result was used as glass for windows. It was in the days when glass was a very expensive matter, and its brittleness formed one of the difficulties of house building. But the Korean paper was not at all brittle, so that it practically was everlasting. It had another quality: it flaked wonderfully into finer sheets, and the industrious and thrifty Chinese spent their time flaking it until it assumed a thinness which was incredible. Naturally enough, the thinner it was, the better for the particular purpose, since its transparency was greater, so that the labor of flaking was amply repaid. There are several reasons why the industry has decayed, but the principal reason is the laziness of the native. Korea is a land where it is always afternoon in the eyes of the native.

BRITISH CHEMICAL MARKET.

Paper-Making, London, reports: The market for chemicals used in paper making remains very quiet and there are no changes in the quotations:

	Per Ton. £	s.	d.
Alum, lump, loose	5	5	0
Sulphate of alumina, 14 per cent.	4	10	0
Bleaching powder, 35 per cent.	4	0	0
Caustic soda (5-7 cwt. drums)—			
White, 70 per cent.	9	12	6
White, 60 per cent.	8	12	6
Cream, 60 per cent.	8	10	0
Ash, 48 per cent.	5	5	0
Crystals, in bags	3	0	0
Crystals, in barrels	3	7	6
Bicarbonate, in 1 cwt. kegs..	6	15	0
Sulphur, recovered	4	15	0
Sulphur, roll	6	15	0
China clay, f.o.b., Cornwall, £0 11 0 to	1	10	0

PULP AND PAPER MARKET.

The market for sulphite is very good, both in Canada and the United States. In the States trade is slack in book, but with every indication that within a couple of weeks the market will resume its activity and be able to take freely of all the pulp made in the United States.

There is a good demand for ground wood. One of our largest manufacturers is fully booked, practically the whole output going to the United States. This indicates either a shortage of water over there or an unusual demand for paper on account of the approaching election. Prices are being well maintained owing to the high price of wood all last winter, and to wages. There is no indication of a cut in the market. The biggest corporations in the States are not waiting for the fall to make contracts, but are getting supplies for both present delivery

and later on in the fall, thus taking no chances. The International and the Great Northern are in the market.

Reports from New York show ground wood still at $15, f.o.b., at pulp mill. Domestic bleached sulphite, 2.75 to 3c.; unbleached, 1.85 to 2⅛c.; foreign bleached sulphite, 3⅛ to 3⅜c. (delivered, New York and Boston); unbleached, 2 to 2.30c.; domestic soda fibre, 2¼ to 2.35c.

In the British market bleached sulphite is quoted at £10 10s. to £11 10s.; unbleached, £8 10s. to £9; soda, bleached, £9 15s. to £10 10s.; unbleached, £7 15s. to £8 5s.; ground wood, 50 per cent. moist, £2 2s. 6d. to £2 7s. 6d.

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PAPER STOCK MARKET.

Montreal, Aug. 15th, 1904.

The paper stock market is fairly active. The supply of domestic rags, for several reasons, is smaller this year than usual. The paper mills, on the other hand, seem to be using waste material more freely than formerly, and considerable quantities of imported rags are coming to this side. Prices are about the same, but are fairly firm.

Common waste papers are low in the States, and are likely to weaken in price here. The better qualities are scarce and in good demand. The better grades of cotton cuttings are being closely bought up. Manilla rope continues steady, possibly a little firmer. Old bagging still dull, and without sale. A ten per cent. customs duty, recently imposed by the United States, has had the effect of keeping this stock in Canada, and there are accumulations everywhere—a good opportunity for some mill to make a cheap line of strong wrapping.

Quotations remain the same.

Domestic white rags	$2.00 to	$2.10	per 100
Mixed bagging	55 to	65	"
Blues and thirds ...	1.25 to	1.30	"
Dark cottons	75 to	90	"
Roofing paper stock	50 to	55	"
Waste papers	35 to	45	"
Hard white shavings	2.00 to	2.10	"
Soft white shavings.	1.00 to	1.50	"
Book stock	75 to	90	"
Manilla rope	1.75 to	2.00	"
Sisal and jute string	75 to	1.00	"
Flax tow	1.00 to	1.25	"

—The French grocer commonly boxes his sugar for sale to his customers. A recent fall in the price of that commodity has led to a greatly increased demand for it, and hence for boxes. In order to meet this, two well-known Parisian printers' engineering firms, M. M. Deirriey and Lambert & Co., have designed machines capable of cutting out box blanks, printing on them and turning out the finished boxes at the rate, it is said, of 15,000 per hour!

—An effort was made by the authorities of the St. Louis Exposition to secure the exhibition of a working paper machine. A canvass of machine builders and of paper manufacturers was made, but the leaders in the industry were not at all enthusiastic in the matter on account of the difficulties in the way of such a project. As a result St. Louis is lacking at least one feature that was in evidence in the Columbian Exposition at Chicago.

The Paper Mill, of New York, states that an American paper making company is negotiating for the purchase of the Maritime Sulphite Fibre Co.'s property at Chatham, N.B. Freight rates are a consideration to the prospective purchaser. It is claimed that at present there is a discrimination against Chatham, and that the Intercolonial carries pulp from St. John at a lower rate than from Chatham to the same western points, though Chatham is a

hundred miles nearer those points. A deputation recently interviewed the Government to urge the reduction of the rate. The result has not yet been announced.

Isaac Weldon, formerly of the Laurentide Paper Co., now with the Burgess Sulphite Co., Boston, Mass., is visiting his brother in Toronto, preparatory to a two weeks' visit to the North-West.

J. S. Tait and A. R. Yule, chartered accountants of Edinburgh, are the liquidators of the St. John Sulphite Pulp Co., Mispec, N.B. Creditors are ordered to lodge their claims with the liquidators by September 4th. The petition of J. A. Likely for the winding up of the company has been granted. It is rumored that a company in the United States has an eye on the property at Mispec.

—According to Das Papierfach, published in St. Petersburg, the importation of Finnish paper into Russia has greatly increased, the amount in 1854 being 7,800 poud, and in 1902, 2,672,000 poud. Finnish manufacturers enjoy an ample wood and water supply, and low duties on machinery and raw materials. The increase in the Russian imports induced the Government to impose a duty

on Finnish paper, and this is still in force, but instead of checking imports it only put Finnish makers on their mettle, and enabled them to save the duty in improved methods and various economies. It is stated that the enormous water power in Finland is one of the great advantages possessed by pulp and paper makers. There are 793 waterfalls, giving 2,800,000 horse-power. Of these, 68 falls are at present made use of (giving 311,000 horse-power) by 74 paper and pulp factories.

—Since last issue, the strike at the Royal Paper Mills, East Angus, Que., has been settled, and the mill is running with a full force.

PULP AND PAPER MAGAZINE

MONTREAL AND TORONTO

Vol. 2. CONTENTS—SEPTEMBER, 1904. No 9.

INDEX TO ADVERTISEMENTS.

—The following paragraph, now going the rounds of the lay press, is given without endorsement: Jacob Smith, a glass-worker, conceived the idea of utilizing the refuse of pulp mills near Muncie, Indiana, where he worked at his trade. Each mill turns out thousands of tons of refuse annually. This refuse, a combination of soda and lime, is mixed with crude oil and the finished product resembles putty. It may be cut with a spade and thrown in a furance or beneath a boiler and it may be used either for domestic or manufacturing purposes. No kindling is necessary, for a match touched to it will light readily, the material burning with intense heat. There are no clinkers, and the ashes remaining after the fire has burned down may be made into a new compound, for which Mr. Smith has a new use. The fuel is said to have more heat units per pound than either coal or wood; the claim is that it can be manufactured and sold at half the cost of coal, and it does not smoke unless a strong draft is used. A bushel basketful of the fuel beneath a sixteen-horse power engine kept steam for eight hours. It is manufactured as a plasterer makes his mortar.

—By a recent invention, millboard is adapted for use in forming panels in woodwork, and for other purposes, by saturating it, in a heated and dried condition, with gum tragasol, either alone or mixed with boiled linseed oil, or with other ingredients. The millboard is soaked in the heated gum and then baked for from 12 to 24 hours, the result being to make it more elastic and more impermeable to moisture.

The Quatsino Power and Pulp Company, of Quatsino Sound, B.C., have now a number of survey parties in the field. The mill will be commenced not later than January next. By this time next year it is expected that there will be 300 men employed at Quatsino by the company.

THE
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Pulp and Paper Magazine

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PEAT PAPER.

The February number of this magazine contained an article on experiments that have been made in Canada and in Ireland recently in the manufacture of paper boards from peat. Since the experimental machine set up by Mr. Dobson at Beaverton, the erection of a factory having three machines with a capacity of 30 tons of "half-stuff" per day has been started at Cannington, near the south-east shore of Lake Simcoe, and is soon to be in operation, under the auspices of the same gentleman. The report of the Ontario Bureau of Mines for 1904, recently issued, speaks encouragingly of this industry, though in view of the collapse of the experimental factory in Ireland, and the failure, commercially speaking, of experiments in this field in the Eastern States, it must be admitted that there are difficulties yet to overcome. The remarkable capacity of sphagnum—from which plant the peat beds are formed—for absorbing and retaining moisture, is one of the problems to solve; but no doubt human ingenuity will be equal to the case. As a substitute for other fibres in the making of imitation leather, as well as for paper boards, there would appear to be a distinct field for peat, and the samples used by some Canadian shoe manufacturers for the filling of boot soles and heels are said to be a great improvement over other leather substitutes. This process is the invention of an Austrian, who died this year, but the works established at Admont, Austria, for exploiting the process, are reported to be a commercial success. The cost of making boards there is given as $9 a ton, but in Ontario the cost is calculated to be $12.50 or about half the price of strawboard and less than half that of board made from wood pulp. At the works at Cannington, it is proposed to make card board, leather board, fibre board, and other lines now made from straw and wood pulp. A sample made at Beaverton is on view at the office of the

Pulp and Paper Magazine, and though it is made of a mixture of peat and wood pulp, it is much stronger than ordinary board, and experts say it will make an admirable board for bookbinders' use. Canada is as wealthy in the raw material of this product as she is in pulpwood, for millions of tons of peat are to be found in various provinces, more especially in Northern Ontario and Quebec.

With regard to the Callender Paper Mfg. Co.'s peat paper mills, at Celbridge, Ireland, referred to in our previous article, it is claimed in the statements made before the court on the application for a winding-up order, that with more capital the concern can be made to pay. The mills have been visited by R. W. Sindall, an expert in the paper trade, who reports that the patents are of value, and that the mill can be run successfully from a commercial point of view when certain alterations are made. It is said that other experts confirm this report.

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FRANCE AND CANADA.

The Canadian commercial agent in France in a report quoted in this issue recommends that country as a market for Canadian wood pulp. His suggestion should be worth serious consideration on the part of Canadian manufacturers. As will be seen, France now gets her supply almost entirely from other countries in Europe, and the great proportion from Sweden, Norway, and Germany. As yet, neither the United States nor Canada has entered the French market to any considerable degree, but pulp from America will ultimately be placed on that market in large quantities, and this trade might be developed by Canada to a greater extent than by the United States. Quebec mills are much nearer France than are the mills of the States, and by the commercial treaty of 1893 Canadian pulp enters France under the minimum tariff; so that we should stand a much better chance in the French market than our neighbors to the south. The natural advantages for pulp shipping of course lie with the mills situated at or near tide water, and it would seem most appropriate that the province of Quebec should supply one of the raw materials of civilization to the country which gave it birth, and with which it is still connected by a common language. The market is open and inviting; the demand is growing; the competitors are the same ones which Canada meets in Britain; a special inducement in the shape of a tariff preference is offered to Canada; and dealers are ready and waiting to welcome the Canadian article when offered in suitable form. It only remains for the producers of this country to establish permanent agencies in France, to study the needs of consumers there, and to enter the field with vigor and enthusiasm.

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Pulp & Paper Currency

A few months ago some of the causes of the decline of British paper exports to Canada were explained in this magazine. One of these causes was the failure of British firms to keep stock of their goods in a warehouse in Canada, from which their Canadian customers could draw supplies when wanted. Not being available on demand, these supplies are ordered from the United States, where they can be got in a few days, whereas the customer would have to wait a month or two if paper is ordered from England. A local warehouse would, therefore, give a

British firm all the advantages of a Canadian mill, but Old Country firms have not appreciated the benefits of "a local habitation and a name," and their trade has in many cases dwindled to the airy nothings which make up the rest of the quotation. That the type foundry and printers' supply business is in much the same position appears from a prize competition announced a few days ago by John Haddon & Co., who propose to give £448 in prizes to compositors who set up the best style of advertisement from "British made type." It appears that in a large printing office in Toronto not enough of this type could be found to set up a display advertisement. On enquiry we found that type of United States make while inferior to British in quality of metal, is more favored in Canada for its style and from the fact that small orders from printers can be filled more quickly than from Great Britain. Haddon & Co. have recently established a type warehouse in Toronto and hope to remedy this state of things, but the type case is typical of many other lines of trade, and explains why careless Britishers have lost their hold on the Canadian market to such an extent in recent years.

A correspondent of Paper and Pulp discusses the outlook of the paper trade in Japan. The demand for foreign paper in that country, which was quite large before the war, has increased over 20 per cent., and is expected to increase still further. Superior qualities of paper have been imported from Germany and Australia in the past, the local makers supplying only the coarser grades. The general tendency in Japan now is to use better grades of paper in newspapers and periodicals, and Japanese makers are preparing to meet the demand, with the result that the quantity of paper imported from Europe in 1903 was one-sixth less than that in 1902. The chief aim of the Japanese, however, is to supply paper to China. For ten years they have been working toward that end, but trade has been interrupted successively by the Japo-Chinese War, the Boxer uprising, and the Russo-Japanese War. The present war has not interfered with this trade as seriously as was expected, and Japanese manufacturers are very hopeful of a large development of the Chinese market for their paper.

The question of paper testing is a live one at present in British and Continental papers. The establishment of a standard system of testing is certainly a consummation devoutly to be wished, as is the standardizing of all other units, and discussion and criticism with that end in view is to be most heartily welcomed. The paper standards generally recognized in European countries are those of the K. K. Versuchs Anhalt, Charlottenburg, Berlin, often spoken of as the breaking-length method. Last year, however, four English experts, C. F. Cross, E. J. Bevan, Clayton Beadle, and R. W. Sindall, published the results of a long series of tests and experiments in "An Essay Towards Establishing a Normal System of Paper Testing." This essay explained the "C.B.S. Units," by which the technical description of a paper is given through its physical and chemical properties, prominent among which is specific gravity. The authors claim that the adoption of a conventional standard, such as breaking length, while having many advantages, has also many disadvantages, mainly that it obscures points of importance to the paper maker, and that it is in favor of the buyer.

The essay was written with the avowed

purpose of provoking discussion in order that a normal standard may be discovered before an imperfect system becomes so far fixed as to be difficult of revision. In their object of provoking criticism, the authors were, in one quarter at least, eminently successful. Dr. Paul Klemm of Gautzsch, recently published in Wochenblatt fur Papierfabrikation, a technical criticism of the C.B.S. Units. This criticism was quoted by our contemporary, Paper and Pulp, of London, and that magazine has since opened its columns to the argument, which has been carried on energetically by the authors of the C.B.S. Units, on the one hand, and Dr. Klemm on the other.

According to statistics furnished to D. H. Ross, Canadian commercial agent at Melbourne, the present exports of Canada to Australia in paper are not very extensive. From the returns of the Customs Department of the Commonwealth for the calendar years of 1902-03, it appears that the latest exports from Canada to the Australian colonies comprised in the Commonwealth, amounted to £3,188 sterling in 1902, and £2,704 sterling in 1903, in paper, books, etc. This did not include stationery, the Canadian exports there only amounting to £177 in 1902, and £12 in 1903. The United States does a large trade with Australia in paper, as we have already shown, and Canadians should wake up to the possibilities of that market.

Until a few years ago, the Sicilian mines produced almost the entire sulphur supply of America, and these mines being all under the control of the Anglo-Sicilian Sulphur Co., consumers had to pay monopoly prices. Recently, however, conditions have changed. Mines in Louisiana are being worked by the Union Sulphur Co., and the output is increasing so rapidly that not only are the Wisconsin pulp mills being supplied, but eastern mills are now receiving American sulphur. This competition has resulted in a deputation from the Anglo-Sicilian Co. coming to the United States to arrange terms with the Union Co. It is said that the Union Co. will not consider the Anglo-Sicilian Co.'s proposition, so competitive cuts in prices are not improbable. The Louisiana mines, according to officials, contain at least 40,000,000 tons. The present company is the sixth to take hold of the mines, but the first to work them profitably, their success being due to the application of the Frasch process, invented by Herman Frasch, the president of the company. In Ontario there are deposits of iron pyrites, which may yet become important in the production of sulphuric acid. One deposit is near Bannockburn, and is worked by the Madoc Mining Co., while the other deposit is near Helen mine, Michipicoten. About 7,000 tons are produced annually, nearly all of this going to the United States for the manufacture of sulphuric acid.

Reverting to the comment in last issue on the paper trade in Western Canada, a Winnipeg correspondent asks if a paper mill in that city will not pay? He points out that many tons of waste paper from printing offices, bookbinderies, etc., are destroyed every week, and that those who have this waste product on hand not merely fail to put it to any use, but actually have to pay $1 a load to get it carted outside the city limits, where it is burned. This is certainly a lamentable waste, but we may inform our correspondent that two conditions are necessary to make such an industry profitable: 1st. Cheap power with plenty of water. 2nd.

Another raw material, such as the screenings from a chemical pulp mill to mix with the waste paper to give it strength. Such a mixture could be used in a paper mill devoted to building paper and for this there is a good and growing market in the West. When cheap electric power shall have been brought to Winnipeg, the first condition will be fulfilled, particularly if the city owns the power, and can fix the price for such power on a permanently low basis. When the Nepigon pulp mill is in operation, the screenings necessary for mixture with the waste paper pulp can no doubt be furnished at a price and in quantities sufficient to keep such a mill going. At present the freight rates would prevent dealers from shipping waste paper from Winnipeg to any of the Ontario mills, to be repulped. The enterprise will, therefore, depend on getting cheap power to Winnipeg or otherwise having the mill located within such distance of the city as would enable the promoters to haul the raw material to the mill and ship the finished product back.

Reports of British paper exports show that Canada is a much better customer of Great Britain than is the United States. Exports to the United States of writings, printings, and envelopes have been going down during the past three years. For the six months, January to June, this year, the States bought £16,897 worth of paper from Britain, as against £21,622 in 1903, and £26,345 in 1902. On the other hand, Canada's purchases for the same periods have gone up from £27,087, in 1902, to £36,112, in 1903, and £46,984, this year. In other lines, beside writings, etc., the United States is the larger customer, but taking into account the great disparity in population, that country does not consume anything like the quantity of British paper that Canada uses.

Australia is not considered an extreme protectionist country compared with such countries as the United States and Germany, and moreover, it is in the van in social and legislative experiments, and yet it has some reactionary notions that carry the Commonwealth back several centuries. For instance, it imposes a high duty on trade catalogues, and this duty is levied on such publications from the Mother Country and the sister colonies just the same as from foreign countries. Such a duty is so unusual and so annoying to the recipient, as well as the sender of trade literature, that it is a wonder the commercial community has not rebelled against it. It is worth while noting that the Government of India now admits free of duty all trade catalogues, circulars, etc., whether imported through the post or in packets or parcels.

Forestry and Pulpwood

The Lake Superior Corporation will cut 50,000 cords of pulpwood during the coming winter, in addition to 25,000,000 feet of white pine, and five million feet of veneer lumber.

It is anticipated that pulpwood will be scarce in the Ottawa district this year, on account of the stranding of logs at high water. Pulpwood being lighter than saw logs, scattered more widely, and much of it will be hung up till next spring.

Owing to the depressed state of the British market and the fact that a great many logs are at present on hand, the lumber cut of the coming winter will be much lighter than usual. From New Brunswick right through to Georgian Bay it is estimated that the cut on the whole will be reduced by one-third.

There are about 210,000 logs and pieces of pulpwood on the Gatineau. A considerable quantity of this is pulpwood belonging to the E. B. Eddy Co.

There is now a tree plantation at the Ontario Agricultural College which consists of over 50,000 seedlings of various kinds. E. J. Zavitz, B.A., who has charge of this department, is at present making a study of conditions in Ontario with a view to farm forestry.

Last year the Imperial Paper Mill Co. cut more pulpwood than it required, and it was able to sell 16,000 tons of the rossed article to other concerns and to make a profit on $3.50 a ton as the selling price. The company is by no means prodigal of its pulpwood. It cuts to the very best advantage, so as to provide for continuous renewal. And the care shown in the regulation of the cut is not greater than that for the prevention of fires.

Engineers in the employ of the James MacLaren estate are now at work on a scheme on the Lievre river, similar to that being planned on the Upper Ottawa, and having for its purpose the conservation of water so as to ensure an equable supply the year round for the MacLaren mills at Buckingham. This object will be attained, as on the Ottawa, by the building of a dam or series of dams at the outlet of one or more of the lakes on the Upper Lievre. The scheme will also ensure greater certainty in the driving of the logs, as a reserve supply of water during the dry season will dispose of the danger of logs being "hung up." The MacLaren Company does its own log driving.

Forest fires of a very serious nature have raged in different parts of the country during the past month. In British Columbia damage has been done on the coast, and also in the Kootenay region. Standing timber was destroyed to a value of at least $3,000,000. Lumber camps have been destroyed, and the towns of Michel and Wellington were threatened. In Newfoundland the fires have all been extinguished, as nearly as can be ascertained. The loss is estimated by an experienced lumberman as being equal to twenty years' cut by all the mills at present operating. The fires partially or completely destroyed several settlements.

An interesting experiment was conducted last year by the United States Government showing the feasibility of making provision during lumbering operations for reforestation. The Government advertised a lot of white pine on a reserve in Minnesota to be sold on condition that all brush should be burned and that seed trees should be left standing. These conditions were hailed with derision by lumbermen, as being impossible demands; but at the sale the prices were bid up to $11 per thousand. The conditions were carried out, and in the spring one of the bosses reported that the brush burning cost just ten cents a thousand. The burning of the brush is advantageous in two ways, in greatly lessening the danger of fire, and in clearing the ground for the seed from the seed trees left.

The United States Government is considering a plan to establish automatic wireless fire alarms in its forest reserves.

The Bowdoin Paper Manufacturing Company of Brunswick, Maine, has recently purchased 100,000 acres of timber land in New Brunswick. The land is heavily wooded and is situated on the Bay of Fundy about forty miles above St.John. The tract has a frontage of about fifteen miles on the bay which makes the product easily available for water transportation.

The cut on the Rouge river and its tributaries this summer was about one million two hundred thousand pieces. Of this, the Riordon Paper Mills cut about five hundred thousand. Three or four hundred thousand pieces from last year's cut are still in the river.

PERSONAL.

John Craig, treasurer of the Imperial Paper Mills, will be made managing director, and will live in this country about eight months of the year.

T. D. M. Burnside, a Toronto old boy, now director and London manager of Pirie, Wyatt & Co., will be in Toronto about the end of the month.

J. H. McNairn, of Toronto, manufacturer of waxed papers, was in Dansville, N.Y., recently, looking after the improvements now being made in the Phœnix pulp and paper mill, which he owns.

Mr. Craig, president, and Mr. McCormack, general manager of the Imperial Paper Mills, Sturgeon Falls, visited Toronto recently.

Robert S. Hall, superintendent of the Riordon Paper Mill, at Hawkesbury, was recently presented with a magnificent library suite by the employees of the mill. Mr. Hall has been with the firm for ten years, about half that time being spent at the Merritton mill.

Thomas McCormack, the new manager of the Imperial Paper Mills, succeeding Mr. Rantoul, was formerly superintendent of the mill. Before entering the company's employ, he had been superintendent for the Union Bag and Paper Co., and for the International Paper Co.

Alex. McDougall, civil engineer, who recently returned to Ottawa from England and the Continent, where for some time he has been studying some of the big engineering works, has just been appointed to design new reservoirs for the Chicoutimi Pulp Company and Price Brothers, of Quebec, to ensure them a sufficient water supply for their mills at the season of low water.

PRINTING AND PUBLISHING.

The Poole Publishing Co. has been incorporated at Toronto with a capital of $40,000. The provisional directors are: J. M. Poole, G. McP. Clark, and H. L. M. Weller, all of Toronto.

Brown Bros., Limited, wholesale stationers, of Toronto, who were burned out in the big fire of April last, suffered again on August 21st, when the Queen City Curling Rink, occupied by them, was destroyed by fire. Their stock was almost entirely consumed, and the loss to the company is estimated at $75,000. The Curling Club, the owners of the building, lose about $25,000.

THE SEA PINE OF FRANCE.

Although the "pin maritime," or sea pine of France, is not used for pulp making, the results of its cultivation by the French Government are such a remarkable illustration of the value of scientific forestry that the report of United States Consul Tourgu, at Bordeaux, should be studied by Canadians:

"The growth of the 'pin maritime' in the Landes and adjoining departments, says the Consul, undoubtedly marks the most remarkable achievement ever wrought by human agency in the modification of natural conditions of soil and climate for the benefit of mankind. It is a marvellous demonstration not only of the practicability but also of the almost boundless beneficence of reforestation. It demonstrates the fact that while human recklessness has swept forest and verdure from so vast an area of the Old World and the New, human skill and care are able to reclaim the most barren and desolate regions with a growth which not only stays the advance of devastation, but re-establishes in its place the most healthful, agreeable, and profitable conditions.

At the beginning of the nineteenth century the region between the Gironde and the Pyrenees, excepting a narrow belt which skirted the southern bank of the river, extending inward from 50 to 100 miles, was not only one of the most barren in the world, but apparently altogether hopeless of reclamation. For 100 miles along the shore of the Bay of Biscay there stretched a threatening array of gray sand dunes which year by year pursued their irresistible march toward the heart of the most productive land in Europe at a rate varying from 1 to 200 feet a year.

In the first year of the nineteenth century, one of the sons of the doomed region had an idea. It was a simple one, but the times and circumstances were ripe for its adoption. It was that if the seeds of the pin maritime were gathered, sprouted carefully, and the young trees planted in advantageous positions, where the moving sands would not overwhelm them until their tough roots had taken a

firm hold, their wiry leaves, which loved the briny spume, would offer no resistance to the wind, and, falling about their roots, would give shelter and nutriment until a forest grew which would hold the sands in check and save the threatened interior from desolation.

To-day the dark squadrons of the pin maritime are posted on thousands of sandy slopes, faithful guardians in the shelter of which the vineyards and wheatfields rest secure. The gray dunes, which were sweeping over the land have become serried fortresses, which shelter civilization and prosperity. Here, again, man has pitted himself against the destructive forces of nature and won, making the winds and waves his servants for the renovation of past evils and the establishment of future benefits. Lumber, firewood, resin, turpentine, and all the by-products of resinous distillation are now produced in such abundance here as not only to prevent the need of importation, but to make southwest France a considerable and profitable exporter of the same. Not only the finest lumber for domestic uses is produced, but railway ties, telegraph poles, fence and vineyard posts, millions of the pit props which sustain the roofs of English collieries come from the eastern shore of the Gulf of Gascony —the ships that bring Welsh coals carrying back the supports which make the mining of coal possible.

The United States, which in the beginning of the nineteenth century had the monopoly of naval stores and the resinous products for which civilization makes increasing demand, now finds a rival in the pins maritimes of the dunes which were then worse than barren, and it is today a considerable importer through the port of Bordeaux of the finer products of resinous distillation. While we have wasted our abundance by reckless destruction of our forests, France, by intelligent conservation of hers, through reforestation of her dunes, has made them productive and profitable.

The pin maritime is now planted in large quantities as a matter of profit by the owners of sandy lands, which are properly located. As its name implies, it prefers an exposure to sea air and does not object to a subsoil having a brackish impregnation. It does not succeed where it meets a temperature below zero for any considerable time, nor in a continuously dry climate. A location subject to severe droughts, with a dry subsoil in a climate like that of the northern part of the United States, is not likely to prove suitable for the growth of this tree.

There are now nearly 700,000 acres of pins maritimes growing in France, one-third of which is under control of the Government, and two-thirds in private ownership. The trees are usually grown in nursery rows, carefully protected by mulching or some sort of low, growing shrubs or grain for two or three years, and then set out in the plantations. In removal from the nursery, the roots must not be exposed so as to become dry even for the briefest period. After twelve years they become, under ordinary circumstances, large enough to be "worked" for resin, which they continue to yield for thirty years and are then cut for timber.

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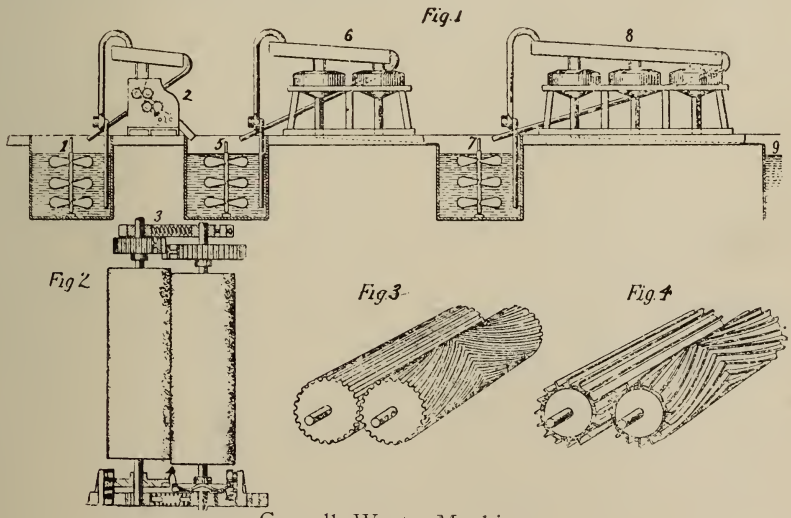
—"One of the worst for the pulp industry," is the description applied to the year 1903, in British Consul Dundas' report on Norwegian trade and commerce. Comparing the exportation of pulp with that of the preceding year, which he admits was the best during the last five years—he shows that in 1902, the exports of dry were 18,347 tons, with a value of £79,818, and of wet 342,313 tons, the value being £649,603. In regard to dry, the year 1903 showed an increase in quantity to 19,682 tons, with a diminished value to £71,572. As to the wet, the quantity was reduced to 333,071 tons, and the value was only £561,639. As to the abortive scheme for a common selling office of Norwegian and Swedish pulp last September, it is passed by with just an allusion and the phrase: "The failure of some Canadian mills about that time somewhat improved matters for the Norwegian producers."

MILL WASTE.

A patent has been granted to W. N. Cornell, of Massena, N.Y., relating to a method of reducing coarse wood particles to a condition of pulp, irrespective of how such coarse particles were originally produced, and also to utilize for making paper, paper board or similar product, the "screenings" which, being too coarse to pass through the screens into the stock, are disposed of as mere waste without value. The final product is intended to be a paper stock at least equally as good as the stock from which the screenings were originally separated.

The first step of the process is to separate the fibres from each other with as little transverse breakage as possible, so that the final stock will be composed of comparatively long fibres instead of short bits. The most suitable way of accomplishing this disintegration of the particles is to crush them, at the same time accompanying the crushing effect by a slight drawing action. The result is that most of the fibres are separated without being broken. Since the drawing is always in the same direction with reference to individual particles, practically only those will be broken transversely which are presented with their fibres lying substantially in the direction of the drawing action. At the end of this step the fibres will be found separated or the particles flattened out and the fibres only very slightly connected together. In the former case the patentee does not wish to be understood to mean that each individual filamentary fibre is freed from the adjacent fibres, but rather that the most of them are in minute bundles of several fibres each and are either small enough to be pulped immediately, or but comparatively little larger than the proper size for the stock. If the material is not in condition for the stock, either because the component particles are too large or have not been well separated from each other, it should be again reduced, this time preferably by a grinding or rubbing action continued until the particles are fine enough for the purpose desired. If the original particles, after being crushed and drawn are not small enough even for proper reduction by grinding, it may be necessary to again subject the material to crushing and drawing and then to grind or rub it down. In fact, the patentee has found that these last mentioned steps are in most cases necessary for best results, and accordingly it is desirable not to attempt by one step to put the material in condition for pulping or even for grinding, but instead to



Cornell Waste Machine.

give it a preliminary crushing and drawing with comparatively slight resulting reduction, then one or sometimes more similar treatments, before it is subjected to the grinding or rubbing. It has also been found necessary in some instances to repeat the last step—the grinding or rubbing—a number of times before the material is brought to the proper condition of fineness.

Fig. 1 shows the entire apparatus diagrammatically, partly in section. Fig. 2 shows the first set of rolls in detail, and Figs. 3 and 4 the succeeding rolls.

In carrying out the process with this apparatus the screenings or other material are mixed with water and pumped or otherwise withdrawn from the tank 1 into the machine 2. The latter has a series of roll sets between which the material passes successively. The first set is preferably made of sandstone, dressed smooth. The surface of each roll, however, being necessarily capable of taking a polish is therefore slightly rough, due to the grain of the stone. They are preferably mounted in movable bearings 3 for ready adjustment toward or from each other, so that any desired degree of crushing action may be produced. In order to secure a simultaneous drawing effect, one roll may be geared to rotate faster than the other, or one or both may be given an endwise vibration—as, for example, by means of the face cams 4 and coacting mechanism shown in Fig. 2. The second set of rolls are also, preferably, of sandstone; but instead of being smooth are corrugated—as, for example, in the manner illustrated in Fig. 3. They should be mounted in adjustable bearings and rotate at different speeds with an endwise vibration as the former set. The third set of rolls are intended to effect the third, and what under ordinary conditions would be the final step of reduction. The rolls themselves are preferably constructed in a manner similar to the well-known "Jordan" engine, but have a crushing and drawing action analogous to the other rolls, though preferably not to the same extent, since the material by the time it has passed through the first two sets is very nearly fine enough for the stones and needs only slight further reduction. The rolls are made with blades or bars, as shown, projecting above the surface. The bars may be of iron with wooden slats or bars between them. The latter when soaked with water swell, and thus bind the blades and hold the same secure in position. These rolls should be mounted in adjustable bearing like the others.

The raw material, as it is fed into the machine 2, will first be given a preliminary crushing and drawing, the extent of this action being determined at will by the nearness of the rolls to each other, the difference of their speeds, and the extent and rapidity of their endwise vibration. In passing through the second set the material is again crushed and drawn, the extent of the action being determined as before. The step performed by the third set is generally sufficient to put the material in condition for the grinding or rubbing. From the machine 2, the partly prepared material is discharged into a tank or vat 5, where it may be thoroughly stirred to mix intimately with the finer particles. The coarser bits, which may have escaped the rolls or not, have been fully acted upon. From this tank it is conveyed to the millstones 6 to be ground, as before described. The stones are preferably of the under run type and may be dressed in the ordinary manner or specially, according to the needs of a particular case. For the purpose of applying this step to large quantities of material at one time the patentee provides a number of sets with conduits communicating with the same hopper, so that a part of the material runs into each. From the first group of stone 6 the stock is discharged into a tank 7, where it may be stirred and mixed, as in the other vats, and from thence is conveyed to another group of stones 8, where the rubbing and grinding is repeated until the material is brought to the proper degree of fineness and discharged into the tank 9. Here it may be stirred again and finally run out on to the screens, as in the usual process of paper making.

ELECTRICITY IN PAPER.

Static electricity, generated by friction and compression, has been for years a widely recognized nuisance of a most annoying and expensive kind in a vast variety of industries.

All the paper and textile industries are affected by it, and for the past fifty years it has been a continual fight, using such weapons as steam jets, water sprays or pointed conductors, connected to earth or chemicals, and after the most persistent and expensive applications of these various mitigators, printers and manufacturers have settled down to the conviction that the evil can only be mitigated and not removed. It therefore now comes as a surprise to the manufacturing world that this great evil has its complete remedy in a principle of extreme simplicity, viz., a static charge spontaneously selects from a neighboring alternating charge the kind and quantity to exactly neutralize itself.

Why a principle so simple and so absolutely effective should have failed of discovery to the present time is surprising, and the writer has to confess to many and tedious efforts in other directions before arriving finally at the discovery of this simple and complete solution and fundamental patents have already been allowed him covering the process in all its applications.

Having discovered the operativeness of the principle in laboratory experiments, the writer prepared a portable form of the apparatus and applied it to practical work in various mills with the most complete success. In January, 1904, a paper bag manufactory reported its production curtailed by 33 per cent. by the static electricity sticking the bags together, and also making it extremely difficult to straighten them up when taken from the machines. The portable apparatus was taken to this mill and applied to five machines, with the result that the bags came from the machine in an absolutely neutral condition, and slid out into a perfectly square pile, requiring only to be tied up by the attendant. The machines, which had previously been limited to 200 bags per minute by the impossibility of keeping them straight, were then speeded up to more than 300 per minute, and no trace of static electricity could be discovered, and only one attendant was needed at each machine, where two had previously been employed.

This apparatus was also run through the cold weather of February and March in connection with a number of printing presses, and every trace of the static was removed from paper of a kind that had compelled a complete suspension of work on it at the time under the old methods, and it will be remembered that the winter of 1903-04 was exceptionally severe in its electrical conditions in New England.

Practical tests were also made on the carding machines in a woolen mill, where the roving had been sticking to the rub rolls and to other objects, causing frequent breakage and delay; the application of this principle in its simplest form completely removed the difficulty.

Another interesting application, which has been in service for several months, is on the shearing machines in a factory making fancy lap robes. Until the discovery of this principle it was impossible to remove the shearings from the robes because of the fact that the rotary brush which is expected to clean it, generates electricity by friction and sticks the dust all the tighter, leaving dark streaks on the light surfaces, but with this new apparatus the goods are coming from the shears perfectly clean.

Probably one of the most extensive and useful future applications of the process will be in the spinning and drawing frames of various textile works. It is well known that here the fibres are continually repelled outward from the central line of the roving or yarn, and do not, therefore, get spun in as they should to make smooth yarn, and a special form of the apparatus for this particular service is being developed at the present time.

The apparatus used for performing the process in the several above named applications, already perfected, consists of a special transformer located at any convenient point in the building and connected by a single wire leading to the place where the material is to be neutralized while passing through the ordinary

process of manufacture or handling; here the leading wire is connected to a fine steel wire located eighteen inches or less from the surface of the material as it is passing through, and this steel wire is usually attached to a wooden bar for protection from mechanical injury. The current supplied is absolutely harmless to a person coming in contact with it. It does its work instantaneously.

The apparatus will be manufactured by the Portland Company, Portland, Me.—W. H. Chapman, E.E., in the Paper Trade Journal.

A NEW ROUGH-SURFACE PAPER MACHINE.

Enoch Waite, of Franklin, Mass., has been granted United States letters patent No. 768,353, on a paper making machine. In regard to it, the inventor says: "Heretofore in machines producing a continuous web of paper from a mass of pulp various arrangements have been adopted to produce a variety of paper characterized by having considerable thickness and by having an upper surface covered with numerous prominences usually disposed in close and regular succession. There are various important uses in the arts for such a paper, among which may be mentioned the manufacture of cops of yarn used in spinning and other textile operations. Such cops are formed by rolling a semi-circular sheet of the paper upon itself into a conical form having walls of the desired thickness to ensure sufficient strength. The yarn is then wound spirally over the surface of the cop, and it is essential that that surface shall afford sufficient frictional hold on the yarn to prevent it from slipping toward the small end of the cop, and in consequence becoming entangled and failing to be drawn properly off the cop. Another use for such paper is in the wrapping of articles of a somewhat fragile character where a certain amount of cushioning effect is desired, and it becomes a matter of importance to obtain this effect to a sufficient degree with the use of a minimum amount of stock in the paper employed. The constructions with which I am familiar, which have hitherto been employed to produce a paper with the kind of surface described, are deficient in at least two important respects. First, they occasion excessive wear and injury to certain portions of the mechanism of the machine itself; secondly, they do not produce a paper having a satisfactory surface, or even if the surface is fairly satisfactory when the paper is formed in the machine, it has been found that when such paper is rolled up into a cop or otherwise subjected to pressure, the quality of the surface becomes greatly impaired."

Fig. 1 is a perspective view of a paper making machine made in accordance with the invention. Fig. 2 is a perspective view of a portion of the upper apron.

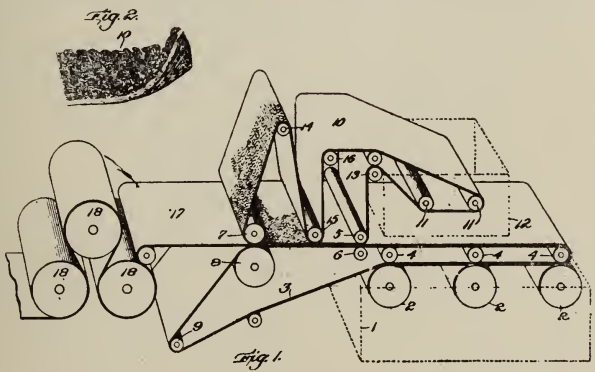
In the drawings, 1 represents the pulp vat, in the upper part of which are set the usual suction rolls 2. In the present case three such rolls are shown, which operate to combine three layers of pulp into a single web of the same; but the invention is equally applicable to machines having more or fewer suction rolls.

The endless apron, commonly known as the "long felt," on which the web of pulp is formed from the successive layers deposited by the suction rolls is designated 3. It passes between the suction rolls and their corresponding couch rolls 4, thence back over the couch rolls, between rolls 5 and 6, thence by a straight run of some little length to the press rolls 7 and 8, thence downward from the press rolls over an idle roll 9, and finally back to the pulp vat.

An upper apron is indicated at 10. It passes round rolls 11 in a washing box 12, sustained above the pulp vat, coming out from the washing box over the roll 13, and thence downward between the rolls 5 and 6, and between the press rolls 7 and 8. From the press rolls the upper apron returns over carrying rolls 14, 15, and 16 into the washing box. Thus the upper apron closely overlies the long felt throughout the straight run of the latter between the rolls 5, 6 and the press rolls 7, 8. This arrangement is for the purpose of evening the web of pulp carried by the long felt, so that when it passes through

the press rolls it shall form a web of paper of uniform thickness. Such a web of paper is indicated at 17 as issuing from the press rolls and at that point separating itself from the long felt and passing between hot drying rolls 18.

Heretofore, it has been attempted to impart to the paper, which has been formed by the press rolls, a roughened surface, by passing it while still upon the surface of the long felt between an additional pair of rolls, one of which is covered with wire; but it has been found that the wire soon cuts into the felt and necessitates replacing the entire length of the latter, inasmuch as it is difficult or impossible to piece the felt without rendering the paper produced by the machine imperfect. Another defect in such a construction as has just been mentioned is that the paper is found to be too dry when it passes through the second set of press rolls to take a good impression.



The inventor has ascertained in the course of experiments that it is practicable to employ in a paper making machine of the kind described an upper apron susceptible itself of imparting to the paper formed from the web of pulp passing through the press rolls the desired roughened surface. Specifically he employs an upper apron having a working surface of coarse woven material, and prefers for this purpose bagging made of jute strands. Preferably, also, such woven material will be backed by a layer of felt, the latter being caused to unite with the woven facing by a suitable mode of manufacture—such, for example, as repeatedly driving or forcing a numerous gang or series of needles having roughened or toothed sides through a loose bat of felt superposed upon the bagging. By this means a part of the fibres of the felt bat are caused to enter the meshes of the woven material.

In passing between the press rolls the pulp is forced into the interstices of the bagging and is thereby molded into a series of prominences of somewhat regular character and pattern, but not too regular—that is to say, the prominences have not a perfectly smooth and curving contour, but exhibit many minor angularities. Further, the entire surface of the paper becomes covered with minute scores, corresponding with the fibres of the strands of the bagging. Also when the pulp is compressed by the press rolls numerous loose ends of the pulp fibres enter between the fibres of the bagging and escape, becoming matted down into the general surface of the paper. In consequence the paper produced and especially the prominences thereof are covered with minute stiff filaments, or, in other words, the paper possesses a surface of what may be termed a "hairy" texture made up of such loose ends of fibre. These fibres therefore form short hooks or spurs and largely increase the frictional holding power of the paper upon yarn or the like wound upon it. At the same time the general surface from which these individual fibre ends project is solidly compacted by the pressure of the press rolls and is not liable to become ragged or disintegrated by repeated handling and use. Such projecting fibres also

increase the cushioning effect of the paper when used for certain other purposes, above referred to. The product thus characterized is not herein claimed, it being described and claimed in an application for United States letters patent filed by the same inventor, November 30th, 1900, Serial No. 38,125.

By the use of an apron, which itself is adapted to impart the desired roughened character to the paper being made, and particularly by the use of an apron having a surface of coarse woven material, all danger of injury to the long felt is avoided.

By the use of an apron composed of a backing of felt and a face of jute fibre bagging or equivalent material the same apron is rendered available both for the making of ordinary paper and for the production of the improved roughened paper herein described. It is only necessary to reverse the apron upon its carrying rolls in order to utilize it in either desired manner. A larger saving in expense is thus effected, especially where a single machine is in use.

Another advantage is that the bagging supports the felt and prevents it from unevenly stretching, and thereby injuring the quality of the paper.

SODIUM HYPOCHLORITES.

The hypochlorites are bodies which have been comparatively little studied up to the present time, although their solutions are put to numerous uses in bleaching. Calcium hypochlorite (chloride of lime), has been the object of a considerable amount of attention to many chemists, but the need of more definite knowledge of the other hypochlorites, particularly that of sodium, has been the incentive to the following investigation. Hypochlorous acid is prepared in the ordinary way by passing chlorine gas into solutions of the caustic alkalies, but beyond the fact that hypochlorites are formed, nothing is known yet as to the concentration of the solution, or its decomposition under the influence of different reagents, and there is as yet too little known about them to allow of their being placed on a level with other well-known bodies the constitution of which is thoroughly understood.

The uses to which hypochlorites can be put as oxidizing agents, particularly on organic compounds, and the study of their specific properties and degrees of concentration, form a group of important problems. An article in the Bulletin de la Société Industrielle de Rouen describes sodium hypochlorite as a very important commercial product, and gives a summary of the various methods of manufacture. The first of these is based on the simple reaction mentioned above, but this was improved upon in 1876 by Planeau, who decomposed chloride of lime in powder by means of a solution of carbonate or sulphate of soda. This short notice summarizes all that was known about sodium hypochlorite up to the year 1890.

In this year Count Brochochi patented an improvement on the well-known "Eau de Javal," but the process was of no practical value. In the following year the same inventor took out another patent for a process which, although of little industrial value, is at least novel from a chemical point of view. In this process dry chlorine and air were subjected to an electrical discharge, and the resulting gases passed into a solution of caustic alkali. The inventor's object is, as he states, to augment the energy of chlorine, but he seems to be ignorant of the fact that the only result produced by his modification is the conversion of the chlorine into Cl_2O. The advantages of this method are well shown by the two following equations: $Na_2O + Cl_2O = 2\ NaOCl$, that is to say, two atoms of available oxygen for two of chlorine, instead of the ordinary reaction $Na_2O + Cl_2 = NaOCl + NaCl$, that is to say, one atom of available oxygen for two of chlorine. The application of an electrical discharge to impart energy to chlorine does not come within the limits of practice.

In 1895, F. Oettel examined the question of sodium hypochlorite produced by electrolysis, which has given rise to several new special processes. His work is very interesting, but his assertion that 1.25

grammes of available chlorine per 100 c.c. is the highest degree of concentration which can be obtained by means of these methods, even in cases where this concentration has been estimated below its value, rather puts his experiments beyond the limits of this article. The same remark applies to another research on hypochlorites below 1 per cent. The Zeitung fur Anorganische Chemie, for 1897, gives a series of careful researches carried out by T. Bhaduri, which are really the first systematic experiments which have been made to prove the possibility of obtaining powerfully active solutions of sodium hypochlorite. Bhaduri passed chlorine into solutions of caustic soda containing from 1 to 20 grammes of Na_2O per 100 c.c. The hypochlorite of the greatest concentration which he was able to obtain, contained about eight grammes of available chlorine per 100 c.c. The solutions thus contained a considerable excess of alkali.

An observation made by this chemist is that, notwithstanding the fact that pure caustic soda was employed, the solution assumes a remarkable color after the formation of the hypochlorite. He attributes this fact to the formation of a permanganate, but has not directed further attention to the point. He also carried out careful researches on the decomposition which takes place when hypochlorites are allowed to stand, and found that a sodium hypochlorite giving 5 per cent. to 8 per cent. by volume decomposes rapidly, even in the dark, producing chlorate and evolving a certain amount of oxygen. At the present day, however, sodium hypochlorite is becoming more and more a commercial product, due principally to the enterprise of the United Alkali Company, who supply solutions of sodium hypochlorite of from 12½ per cent. to 15 per cent. strength. Hitherto this degree of concentration has not been attained by other makers, although the demand for highly concentrated solutions of sodium hypochlorite is continually increasing, chiefly among English paper makers.

It was principally with a view to obtain more precise information with respect to hypochlorites of this class that the present research was undertaken. In choosing an appropriate method for these experiments, which are purely laboratory ones, it is necessary to go back to the old process, which consists in passing chlorine into a solution of caustic soda, this process being the most simple of any. Simple as it is, however, it needs to be explained, as there are certain apparent anomalies which are incomprehensible unless the following equation is accepted: $2NaOH + Cl_2 = NaOCl + NaCl + H_2O$. Of the two atoms of free chlorine, one is combined in the form of inert sodium chloride, and the other is united to the oxygen to form the hypochlorite. Quantitatively, 80 parts of caustic soda unite with chlorine to produce 133 parts of solid and 18 parts of water.

The problem to be solved is the determination of the greatest degree of concentration in hypochlorite, which can be obtained with caustic soda. Preliminary experience has shown that it is impossible to make hypochlorite directly with caustic soda, for the simple reason that no reaction takes place. The first limiting factor for hypochlorite solutions of a high degree of concentration is therefore determined by the maximum degree of concentration of the caustic liquid which it is possible to obtain in the cold.

This concentration may be reckoned at 50 grammes of Na_2O per 100 c.c., which gives, allowing for the increase in volume due to the reaction, a sodium hypochlorite corresponding to 50 grammes of available chlorine per 100 c.c. There is, however, a great difference between this degree of concentration and the greatest degree of concentration obtainable at the present time, and which is admitted so far to be the extreme limit attainable. This limit would, of course, be considerably modified were it possible to exclude the sodium chloride from the solution, leaving only the sodium hypochlorite, which is, of course, infinitely more soluble in water.—L'Industria Della Carta.

The St. John river rose last month and good progress is being made in getting out logs and pulpwood.

THE DETECTION OF MECHANICAL WOOD.

The qualitative and quantitative determination of mechanical wood in paper is of great importance, as the proportion of this constituent plays an important part in adjudicating the value of a paper. The methods of testing employed may be divided into two classes: Those which can be carried out without the help of apparatus, and those in which the microscope plays the chief part. Those included under the first heading may be regarded as purely mechanical processes, while the latter are, so to speak, chemico-physical methods. I shall not enter here into a detailed description of all the methods employed for the detection of mechanical wood, but rather confine myself to a few recently published methods and only glance at the others. I presume, of course, that every papermaker has his bottle of phloroglucinol or aniline chloride solution. The first-mentioned reagent reacts more sharply and is more universally used. The test in this case is a color reaction without the aid of the microscope, the reagent being merely dropped upon the material to be examined. With very small quantities of mechanical wood phloroglucinol gives a distinct red color, and if the quantity of wood pulp is not too large, the red wood fibres can very readily be seen intermingled with the other constituents. This may be taken advantage of to avoid confusion between the recoloration of the stain employed by the hydrochloric acid of the phloroglucinol solution and the actual coloration of the mechanical wood fibres. This extremely sharp reaction is specially important when traces of mechanical wood have to be tested for in what are known as "wood free" papers, and it may also be used for quantitative determinations by colorimetric methods. The chief question to be answered is, therefore, whether the fibres of the wood have really been colored red by the reagent, or whether the red color is merely due to the action of acid upon the stain employed. This disadvantage disappears at once if the aid of the microscope be called in, which instrument shows up the separate fibres, and errors are consequently not likely to be made by those who know what wood pulp should look like under the microscope, a matter of no great difficulty. Moreover, the colors yielded by wood pulp with the various reagents are so characteristic that the distinction between wood and other fibre is a matter of very little difficulty.

Before passing to quite a special application of the microscope, I will just mention the great importance of microscopical examination, compared with the ordinary color tests, as in the former case the wood fibre is visible, and with some practice wood pulp may be accurately estimated to within five per cent. Moreover, in most papers an estimation of the proportion of wood pulp within five per cent. is accurate enough, as conclusions may be drawn with perfect certainty for all practical purposes.

In the Zeitschrift fur Analytische Chemie, for 1903, No. 42, Téclu has published a new method for the quantitative determination of wood pulp, and as in this method the microscope is employed in a way quite different from the usual, it may be of interest to describe the various operations. The method is based upon the well-known fact that the sharply focussed microscopical image suffers in clearness when the distance between the object and the objective of the microscope is altered. At a certain distance the image disappears altogether, such distance depending upon the nature of the object examined, and varies considerably with various substances. It is, therefore, possible, by determining the objective distance, to obtain information as to the composition of the object under examination. The distance is measured by a scale on the micrometer screw of the microscope, and to enable the instant the image disappears to be sharply seen, the object is oscillated, preferably automatically. This method of examination is only suitable for substances having, sharp graphic characteristics, and is particularly suitable for paper fibre examination, and especially for estimating the amount of wood pulp in a

paper. Two kinds of determination of the objective distance at which the image disappears are made, and are as follows:

1. A fragment of paper of about one square centimetre is moistened with a mixture of 50 c.c. alcohol and 25 c.c. of concentrated hydrochloric acid, magnified 140 times, and examined both by reflected and transmitted light. The greater the amount of mechanical wood present the less is the distance expressed in degrees of the scale on the micrometer screw.

2. The same piece of paper is stained with the usual phloroglucinol solution (1 gramme phloroglucinol, 50 c.c. alcohol, and 25 c.c. concentrated hydrochloric acid.) With the same magnification the objective distances obtained are greater, and least when the percentage of mechanical wood is greatest. Téclu discovered a ratio between the distances found and the percentage of wood present, the latter being inversely proportional to the differences between 1 and 2. Thus, if the distance be represented by D, then the percentage will be

$$x = \frac{C}{D}, \text{ C, being an empirical constant,}$$

which in the case of the scale on Téclu's microscope was 1,787. By this means he calculated the percentage of mechanical wood in six previously examined papers, which contained 60.2, 23.0, 38.7, 56.0, 33.2, and 33.2 per cent. of mechanical wood respectively, and obtained the following excellently agreeing results of 50.6, 23.3, 38.5, 55.8, 33.1, and 33.8 per cent. This method, therefore, promises much in the future as the limits of error appear to be very small, and I may perhaps have an opportunity of communicating some personal experiences of this method on a future occasion. A fact I should like to mention in conclusion is that an addition of 75 c.c. of concentrated hydrochloric acid instead of 25 c.c. to the gramme of phloroglucinol, and 50 c.c. of alcohol, causes a much more rapid coloring of papers containing mechanical wood.—E. L. S., in Der Papierfabrikant.

FORESTRY SCHOOLS IN GREAT BRITAIN.

Sir Thomas Elliott, on behalf of the British Board of Agriculture, recently sent the following reply to the Association of Chambers of Commerce, who urged the importance of establishing a National School of Forestry: "The president of the Board of Agriculture and Fisheries fully recognizes the importance which attaches to the question of afforestation and to the provision of a national system of instruction in forestry. Steps have already been taken in more than one direction to give effect to the recommendations of the Departmental Committee, which was appointed in 1902, under the chairmanship of R. C. Munro Ferguson, M.P., to enquire into the subject.

"Through the agency of the commissioners of woods and forests, a School of Forestry has been established in the Forest of Dean, and a movement is on foot for securing a suitable area of land in Scotland for the purpose of demonstrating scientific forestry. The Board have taken steps to secure the establishment of at least two lectureships in forestry in England, and some of the leading universities and agricultural colleges have been giving attention to proposals under this head.

"The agricultural departments of the University College of North Wales, Bangor, and of the Durham College of Science, Newcastle-on-Tyne, appeared to offer special advantages as centres of instruction in forestry, and grants in aid of the establishment of schemes of education in the subject will be made by the Board to those institutions. The Board hope that the arrangements thus made will result in a considerable improvement of the facilities available in this country for the acquirement of a knowledge of practical forestry."

The time within which the Dryden Board Mills, Limited, are to begin construction on their pulp mill at Dryden, Ont., has been extended. The company

has now succeeded in making their financial arrangements and work will commence shortly.

The Moreau's Barking Machine Co. has been incorporated under Dominion charter, with a capital of $40,000. The company will acquire patents granted to Joseph Moreau, of St. Germain de Grantham, P.Q., for an improved bark remover. The incorporators are: O. W. Nordin, of Rosebank, N.B.; O. Brouillard, of Carmel, P.Q.; Joseph Moreau, of St. Germain; K. Nordum, of Rosebank, and P. Germain, of Victoriaville, P.Q. The head office of the company will be in Montreal.

CANADIAN WOOD PULP IN FRANCE.

A. Poindron, Canadian Commercial Agent in Paris, writes under recent date as follows, with reference to the wood pulp trade: Wood pulp is a commodity which Canada should largely export to France. The French imports in 1902 were as follows:—

Mechanical pulp, 116,562 metric tons of lbs. 2,204.

Chemical pulp, 82,159 tons.

The supply came chiefly as follows:—

	Mechanical.	Chemical.
From Sweden	84,639	18,033
From Norway	21,705	16,218
From Germany	5,943	23,994
From Austria-Hungary	.....	11,810
From Belgium	.....	7,037
From Switzerland	.....	3,260
From United States	.....	1,117
From Canada	943	.....

The detailed figures for 1903 are not yet at hand.

From the above for 1902, it follows that three different European countries, none of whom might claim to be better placed than Canada to manufacture mechanical wood-pulp, have deemed it advisable and profitable to supply mechanical pulp to France.

What the French paper manufacturer requires is a good fibrous pulp which will give him the least possible trouble to manufacture into paper, and the least possible loss through breaches of the fibre, and in both senses they are inclined to give the preference to the wet pulp sheets over the dry sheets, and to the wet pulp sheets in rolls over the wet pulp in boards.

The Canadian wet pulp manufacturers ship yearly large quantities of their products to Great Britain, and the Canadian statistics show that during the fiscal year 1903, they have exported pulp to England to the value of $1,129,173. In fact, the rates of freight from Canada to British ports are altogether higher than the rates from Sweden and Norway to the same ports, and if Canadian pulp manufacturers can afford to export to Great Britain in competition with Sweden and Norway, it is likely that, through cheaper cost of manufacturing the mechanical pulp in Canada, they can counterbalance the extra cost of ocean transportation to Great Britain. This would also be possible so far as French ports are concerned.

The Canadian pulp manufacturers, when asked from France for quotations c.i.f. a French port not in direct communication with Canada by a regular line of steamers, should always figure on large quantities and specify the same in quoting, as the cheap transportation required by wood pulp exports does not allow for transhipment. Quotations applying to deliveries in the ports of Dunkirk, Rouen, Nantes, Marseilles, which are not yet regularly connected direct with Canada, but which are the nearest ports for a number of the largely importing manufacturers, are frequently wanted.

For full cargo quantities, satisfactory quotations to the above ports, either by tramp or by sailors, would likely be obtainable from any of the Canadian shipbrokers. I beg to add that contracts for full cargo deliveries are currently obtainable in France. As con-

cerns Le Hâvre and La Pallice deliveries, Canadian manufacturers, through the existing direct steamship connections, are now in a suitable situation to book smaller orders or periodical delivery contracts.

In brief, if the export of wood pulp does not develop, it is not owing to want of attention on behalf of French importers, but owing only to want of offerings on behalf of Canadian exporters. When the prices offered in Great Britain are low, they undertake to give a little more attention to the French outlet, but, unfortunately, when such is the case, as Canadian exporters have no steady agents appointed in France, nor conections previously worked, they try to rush, by correspondence, dealings with people who don't know them, don't know their goods or what they are able to manufacture. I can furnish more information direct to Canadians interested on the subject of wood pulp.

(101 Rue Reaumer, Paris, is Mr. Poindron's address.)

THE BLEACHING OF WOOD PULP.

By R. W. Sindall, F.C.S., and F. Heckford, in World's Paper Trade Review.

The position occupied by wood pulp as a material for the manufacture of all kinds of paper gives this subject an importance which cannot be overrated. The matter requires consideration from three points of view, though it is difficult to state the precise order in which these should be discussed, as they are all of equal importance.

These three points are the economy of the operation, the results obtained, and the actual method of bleaching.

The raw material with which we have to deal is extremely varied in composition, and in its behavior towards a solution of bleaching powder exhibits many peculiarities worthy of our attention.

The wood pulps usually met with can be roughly classified as follows:

(1) Easy bleaching pulps.
(2) Moderately easy bleaching pulps.
(3) Pulps difficult to bleach.
(4) Non-bleaching pulps.

Now all these terms are exceedingly indefinite, for the classification is largely a matter of opinion, and no two papermakers would be able to classify a number of pulps in the same way. This indefiniteness largely arises from a want of a standard to which the wood pulp in its relation to bleaching shall be referred. What is to be selected as a standard? Shall the color of the bleached wood be regarded as a standard, or shall we regard the percentage of bleaching powder consumed in a given time as the standard of reference? Or, again, shall we merely regard the percentage of bleach used to produce a certain color as the standard? In actual practice this latter is really the course adopted by each papermaker for himself, but the standards of one papermaker are not the standards of another, and therefore the adoption of a "color" reference would be somewhat difficult.

It is also a matter of common observation that while a passable color can be obtained with a certain percentage of bleaching powder, yet the consumption of bleach will continue for a considerable length of time if the pulp is allowed to remain in contact with the liquor.

This question of "standard of reference" is not the only one which is interesting to papermakers. Another question is the study of the conditions which regulate the bleaching of the wood pulp. The papermaker desires to know what are the conditions which modify the consumption of bleach required to produce a color which will give him satisfaction. He also desires to be able to regulate all the variable conditions so as to produce a definite color, or to reduce the time occupied in bleaching, and thus as one of the final results bring down the cost of bleaching to a minimum.

We propose to consider this subject from the laboratory point of view, and then show the exact relation of results so obtained to the conditions of mill practice.

We must not overlook the fact that ex-

ceedingly variable results are sometimes obtained in this way, and so there is a tendency on the part of "practical men" to regard the laboratory results as of little value, but this arises from an incomplete understanding of the functions of the laboratory work.

We may, therefore, most profitably discuss, under this head, the methods by which we arrive at the determination of the bleach used for a given pulp. In doing this it is necessary to pay attention to the chemical changes taking place during the whole process, and to study the action of the bleach liquor from the time that it comes into contact with the pulp. Apparently the reaction between the pulp and the bleach liquor is a simple one, though actually the changes which go on are somewhat complicated. To the superficial observer, it is merely a question of plenty of bleach, plenty of agitation, and the gradual change of the wood pulp into a purely white fibre.

But it may be shown that the process is not so simple, for we have to take into account the action of the bleach liquor on other compounds than those actually present in the pulp at the commencement of the operation, compounds produced by the bleach itself in the earlier stages of the change.

With regard to the pulp itself it is important that we should discover and measure the influence of the degree of purity of the pulp, because the great differences found in actual practice as to the amount of bleach consumed can only be accounted for by referring to the constitution of the pulp. In other words, we have to determine what elements are present in the pulp which cause a high consumption of bleach, and also we have to show that those constituents are absent in what is known as an "easy bleaching pulp."

Further, we have to show the bearing of answers which we may obtain for these problems to such questions as the probable yield of bleached pulp from a given weight of the raw material, and the economy or otherwise of using inferior brands of pulp. We must bear in mind that price is not always the measure of value. A pulp which can be purchased at £7 10s. per ton may be a better pulp than one which is offered at £8, that is to say, when everything is taken into consideration. On the other hand a high priced pulp for which perhaps £9 is being asked may be far superior to one offered at £7 10s., although it may not have the appearance and handle of a superior quality.

The value of the wood pulp is not entirely determined by its strength and its behavior on the paper machine. In the case of pulps which are employed because they come under the definition of an "easy bleaching pulp," the cost of the bleaching process and the ultimate yield of pure fibre are important factors, and in some instances the strength of the pulp may be neglected, at least to some extent.

So much then for some of the problems involved in the study of the bleaching of wood pulps.

The first point to which we may call attention is the determination of the bleach required per ton of pulp, as found in the laboratory, and the use of the information so obtained in actual mill practice.

The explanation of the behavior of a pulp when bleaching first involves certain laboratory tests:

(1) Determination of the Amount of Bleach.—Briefly put, the method is as follows, i.e., the method usually given in its general terms: Take a known weight of pulp. Dry at 100 degrees Cent., in order to determine the actual bone dry weight. Tear up the pulp. Place in distilled water and add a definite quantity of a standard solution of bleaching powder. When the pulp has attained the desired color filter off the solution, washing the pulp, and determine the amount of bleach left in the filtrate by titration with standard solution of arsenic.

Now in carrying out the test by such an indefinite prescription as this, reliable results cannot be obtained. The conditions under which the bleaching is effected must be carefully controlled. In the first place it is not desirable to dry the pulp at 100 degrees Cent., and to use the bone-dry pulp for the bleaching test. It is better to take another weighed quantity of the

material and determine the bone-dry weight on this separate portion, using a known weight of the pulp for the bleaching test and assuming that this contains the same amount of moisture as that determined in the first piece taken. It is also necessary that the pulp should be thoroughly broken up for every test made. Unless this is done the consumption of bleach will be higher in some tests than others. The use of distilled water which is common in a laboratory trial is not usually imitated in the mill, and it is well known that ordinary waters consume bleach and allowances must be made for this. The consumption of bleach and the rate at which the bleaching is effected is also influenced by the proportion of water added to the pulp.

If the chemist desires to make the condition of the laboratory trial approximate the conditions found in the mill, he usually employs the ordinary water supply in preference to distilled water and takes the water and pulp in the same proportions for his test as he finds in the mill.

The next point in the prescription given above which needs attention, is the matter of the quantity of bleach solution used. We may either take a very large excess of bleach and then determine what proportion of this is not consumed, or we may add only a slight excess (judging this by our experience of the pulp in question); the results obtained will not always be the same. The temperature at which the operation is conducted must also be taken into consideration, because the heating of the pulp and bleaching solution is a very common practice in many mills.

Last, but not least, the precise stage at which the reaction may be considered complete is a matter which demands experience, because the consumption of bleach goes on for some time after the pulp has attained the desired color.

(To be continued.)

There promises this year to be a heavy crop of white pine seed. The Ontario Agricultural College is making a big collection.

THE REPRODUCTION OF SPRUCE.

The spruce, which is the staple tree in the pulpwood business, is a very difficult tree to reproduce. White pine may be naturally seeded by leaving five or ten scattered seed trees per acre, when cutting, but this method is not applicable to spruce. In the first place our native spruce is so shallow-rooted that scattered seed trees would blow down, and in the second place the seed does not take hold well in the loose soil of the forest. The way spruce will have to be regenerated is by what may be called the strip method, a German plan, which has as yet no recognized English name.

By this plan, the first cut in a forest is made in strips from east to west. The strips are two or three hundred feet wide, and equal strips of standing trees are left intervening. Trees are felled inward away from the standing trees, and the brush is burned. The area is now ready for natural seeding, as the burning prepares the ground to receive the seed dropped from the standing trees. Heavy winds always come from the west, and the fact that the trees stand in strips in this direction reinforces them against windfall, as does also the fact that they stand in groups rather than singly. In the course of from six to ten years the bare strips will be seeded, and the standing timber may be cut from the intervening strips.

This procedure cannot be repeated indefinitely as our native spruce does not produce seed in less than 40 or 50 years. Hence the second-cut strips must be seeded artificially, and for this purpose Norway spruce seed is recommended. The Norway variety presents several advantages over our native spruce. It is an equally good pulpwood, and is a faster grower, a deeper rooter, and a surer seeder. Moreover, the seed is much cheaper. Owing to the cheap labor of Europe, its seed can be bought at about 35 cents per pound, whereas our native seed costs in the neighborhood of two dollars.

On the cutting of the second growth in the strips first cut, this area would be naturally seeded from the standing Nor-

way spruce, and the whole forest would then be not only replaced, but much improved, owing to the superior qualities of the variety of tree introduced.

CANADA'S PULP AND PAPER TRADE.

The report of the Department of Trade and Commerce, for June, contains a summary of trade for the twelve months ending with June. Its statement of exports is as follows: Pulpwood to the United States for month of June, 1903, $167,747; June, 1904, $277,531; for year ending with June, 1902, $1,194,593; 1903, $1,558,560; 1904, $1,788,049. For the past two years pulpwood has been exported to the United States only; but in 1902, $120,445 worth was shipped to Great Britain.

In wood pulp we have exports to Great Britain, the United States, and other countries. The figures for the British trade are thus: In June, 1903, $113,945; June, 1904, $104,641; during the year ending with June, 1902, $818,580; 1903, $1,129,173; 1904, $548,720. To the United States we shipped pulp valued as follows: In June, 1903, $234,719; June, 1904, $183,387; during the year ending with June, 1902, $1,170,400; 1903, $1,795,768; 1904, $1,807,442. To other countries the exports in this line for June, 1903 and 1904, were $5,800 and $23,644, respectively, and for the years ending with June, 1902, $57,418; 1903, $226,002; 1904, $52,912.

These figures show that in the matter of pulpwood our trade is with the United States only, and it has been increasing steadily for the past three years. In pulp, the figures quoted show a decrease this year of $741,869, or 23 per cent. Exports to Great Britain, which somewhat increased from 1902 to 1903, show a decided falling off this year, the amount for 1904 being a decrease of over 50 per cent. The trade with the United States shows a regular increase, but trade with other countries has gone down $173,090, or 76 per cent.

MORE ABOUT MITSUMATA.

A thick, pliant board, styled Onayashi, is manufactured from cortical fibres in the vicinity of Gifu and imported in large quantites to Yamada. Before preparation, it is soft and brittle, like all pasteboard. For transformation the sheets are damped, then wound around a stick about as thick as a broom handle. Several sheets of paper are wrapped on the stick and separated one from the other by other sheets soaked in persimmons juice.

The roll is then covered with cloth and secured at each end, the stick protruding at both extremities. It is then placed on a lever in such a way that one end of the stick runs through a hole in this lever and the other into a hole in the ground. The workman then brings pressure to bear on the lever, until the roll is reduced from 18 inches to 12 inches in length, after which operation it is taken away and unfolded. The sheets are spread out and another roll is made by placing the same sheets in a different position.

This is repeated eight times, and the paper becomes gradually stronger and more pliant; after the final pressure it is as pliable as a piece of muslin. At the end of all these operations the paper is coated with Perilla Ocymoides seed oil and allowed to dry. It requires 100 to over 200 days to thoroughly dry the material. At the end of this time the paper is finished and will withstand any treatment. For colored paper, the dye is applied before oiling. This remarkable paper is almost exclusively utilized for tobacco bags and other objects, but it might be employed for many other purposes, viz., bookbinding, portfolios, tablecloths, etc.

A similar style of paper is the wall paper, made by hand in Japan and already well known. Large works in the environs of Tokio manufacture this paper as described above—not so carefully, perhaps, —and print or draw by hand all kinds of designs upon it.

The leather paper industry cannot be said to yet have been greatly developed at present, though the sale of 200,000 tobacco

pouches, valued at over £3,000, by one firm, at Yamada, demonstrates that it might be.

The mitsumata cannot support great colds, so that its culture could not be attempted in countries where the temperature falls below 10 degrees (Fahr.). As it needs a certain amount of moisture, dry soils are also unsuitable.

The experiment of the American Department of Agriculture will be watched with interest. In Japan it is usual, after the crop, to expose the fruit of the mitsumata plant until the outer covering decays, leaving the black seed bare. The latter is then put into a bag made with the double fibrous web from the petiole, the reticulum of a native palm. The meshes of this natural bag are close enough to prevent the seed from falling out, and to allow the air to circulate amongst the seeds. In this condition they are buried, and about the middle or end of February the nursery is prepared and the seeds are planted in lines, about a foot apart. The plants remain in the nursery until they have attained a height of eight or nine inches. They are then replanted on the hillsides, the soil being previously prepared with a fork.

Some 20,000 to 24,000 are planted per acre, at intervals of six inches or so in all directions. To shelter the plants on the hillsides the Alnus maritima var Japonica (seaside alder), is grown; the distance between these shrubs is twenty feet to thirty feet. Their roots are said to give greater cohesion to the soil, and the dead leaves produce a vegetable mould; finally, the branches prevent the trees from being blown down. Two or three times a year the weeds are pulled and the soil loosened. At the end of the first year after transplantation, the bark can be removed. The mitsumata plant will yield as high as 2,000 pounds of raw bark to the acre.

Although the Japanese have been exceedingly ingenious in utilizing their curious paper for purposes undreamed of in other parts of the world, David G. Fairchild, agricultural explorer for the United States Government, who has been superintending the investigations into the subject, predicts that the inventive American mind, when it begins to develop the industry, will find yet other and more important uses.

Paper suits for men and paper dresses of brilliant and enduring colors for women are a possible outcome of the new industry. For dwellers in the seclusion of some of the modern flats, the fact that strong walls may be made of a paper that will let in the sunlight, but which may be made otherwise opaque, will solve a dismal problem. The paper walls of Japanese houses have long been the admiration of travellers. Improvements on this form of manufacture, with special designs for adaptation to the building trade, are included in the plan of the new undertaking.

Mill Matters

The strike at the Riordon Paper Mill, in Merritton, is over, and many of the former employees are making applications for work.

The ground-wood mill of the Lake Superior Corporation is making over 100 tons of pulp per day. The sulphite mill has not been reopened yet.

The liquidators of the St. John Sulphite Pulp Co.'s mill (Mispec, N.B.), are still open for tenders. Their advertisement appears elsewhere in this issue.

The statement published in these columns last month, to the effect that the Laurentide Paper Co. is selling agent for the Jonquiere Pulp Co., is contradicted by both parties concerned.

The Spanish River Pulp and Paper Co. has taken the construction of its dams out of the contractor's hands and is pushing the work forward in order to have it completed by the spring.

The St. Raymond Pulp Co., of St. Raymond, Que., is reported to have completed plans for the erection of a paper mill. The situation of the mill gives the firm a heavy handicap in the shipping of pulp.

The engineers of the Imperial Paper Mills are now negotiating with Ontario Government engineers, relative to the damming of Lake Temagami, and it is thought that a plan satisfactory to both parties will soon be evolved.

The St. John mill, at Mispec, ran for about a week last month to clear out stock on hand. After an idleness of more than three months, the machinery ran like clockwork, and general regret is expressed in the locality that a mill so well equipped should be idle.

Fire broke out in the wood room of the Imperial Paper Mills, at Sturgeon Falls, on August 24th, but through the united efforts of the town fire brigade and the mill hands, it was extinguished before much damage was done, though at one time it looked very serious. The mill was not delayed more than about eighteen hours. The losses are now being adjusted.

The Imperial Paper Mills contemplate enlargement to at least twice their present capacity, which is 50 tons. They are also planning the erection of a book mill at Smoky Falls, twelve miles up the river. The present mill is using 4,300-h.p. Sturgeon Falls is capable of producing 10,000-h.p., Smoky Falls another 10,000, and Sandy Falls, between the two 5,000, giving a total of 25,000-h.p., all owned by the Imperial Paper Company.

Employees of the Northern Mills Pulp and Paper Company and the Rolland Mills Company men held an outing a few days ago at Ste. Adele, where the new mills of the Northern are located. After inspection of the new mills, a banquet was given to the two hundred employees. A band was in attendance. The directorate of the company is composed of S. J. B. Rolland, president; Hon. J. D. Rolland, vice-president; S. Laberie, secretary-treasurer; Jean Rolland, manager. The company was complimented on the modern equipment of the new mill.

In the manufacture of paper a large amount of steam is used for power as well as for other purposes. Moreover, the demands for steam are not at all constant. The advantages of mechanical draft as an economical factor in the production of steam in paper mills has recently been illustrated in the installation of an induced draft fan driven by a direct-connected vertical engine in the plant of the Chapin & Gould Paper Co., of Huntington, Mass. Previous to the installation of this apparatus, they were using three boilers and all the steam they could generate with a high grade of coal. Since the Sturtevant mechanical draft apparatus was installed, they have been using a much cheaper grade of fuel (which could not be used with chimney draft alone), and now they are only using two boilers and have all the steam they need. They state that they saved the cost of the apparatus in fuel in six to seven months.

The foreclosure sale of the Sissiboo Pulp and Paper Co.'s properties, near Weymouth, N.S., took place in Digby on September 12th. The purchaser was A. G. Ross, of Montreal, manager of the National Trust Company, the plaintiffs in the suit on behalf of the bondholders. The properties comprise about 25,000 acres of good timber land covered with spruce, pine, hemlock and hardwood; the two pulp mills equipped with eleven grinders, compressors, wet machines and all the necessary appliances; a large dam constructed of solid masonry, one of the best in the province; a wharf at Weymouth Bridge, with a large warehouse shed, offices, stoves, smithy, dwelling house, village lots, etc. Mr. Ross intimated his intention of inviting tenders for the purchase of the properties en bloc. The Sissiboo Pulp and Paper Company was incorporated in 1899, with $250,000 bond issues. Upwards of $300,000 was expended in acquiring the limits, the mill sites, the construction of dams and plant, and machinery equipment. Owing to the flood of 1901, and the general depression in the pulp trade, the concern was forced to suspend operations. There are at present considerable enquiries for limits, among them one from Sir Alfred Harmsworth, proprietor of The London Daily Mail. It is possible that local capitalists may purchase, with a view to the reorganization of the company.

The strike of paper makers in Wisconsin, which continued for ten weeks, came to an end last month. The strikers go back to work on the same agreement as made last year, having gained nothing by the strike.

The Maritime Sulphite Fibre Co.'s mill, at Chatham, N.B., is still idle. A United States paper making company is considering the question of buying, but the important matter of freight rates is not yet settled. When the Canada Eastern is taken over by the Government, rates will be quoted by that route. The pulp of New Brunswick mills goes largely to Holyoke, Mass., and the rate from Chatham to that point has heretofore been 17½c. per hundred pounds. It is reported that the Intercolonial is willing to carry pulp to Fredericton for 3½c., instead of 5c., as formerly, making the total haul 16c., but the prospective buyers want to be assured of a rate of 12½c. to Holyoke and other points.

The St. George Pulp and Paper Co., of St. George, N.B., are building a paper mill in Norwalk, Conn. The company wish a larger paper market than that afforded by the Maritime Provinces, and in order to avoid heavy import duties they will manufacture their New Brunswick pulp in the United States. The new mill is so situated that transportation from the pulp mill to the paper mill is very easy. The contract has now been let for the new building, which will be 225 feet long, 43 feet wide, and 19 feet high. Joseph Goodfellow, president of the company, states that 20,000 tons of goods will be landed in Norwalk every year. This includes 12,000 tons of ground wood, 1,500 tons of sulphite, 1,000 tons of other material necessary in paper manufacturing, and about 20 tons of coal per day.

The Canada Coated Mills, Limited, is a new corporation which will build a coating mill at Georgetown. At present 60 per cent. of all the coated paper used in Canada is imported, and the new company anticipate supplying this trade. They will coat book, litho, and cardboard. William Schuhmacher, formerly of the Imperial Coated Mills, of Kalamazoo, Mich., has the construction of the mill in hand at present. The buildings will be 80 by 200 feet, with an "L." It will be two stories high, will be patterned after the latest construction of mills in the United States, and will be equipped with the best machinery obtainable. Mr. Schuhmacher has had thirty years' experience in coating mills, and will take charge of the manufactory. The company is capitalized at $100,000, and the provisional directors are: J. R. Barber, president; Wm. Schuhmacher, John Waldie, Edward Trout, and Robert Kilgour. There is a good opening for business in this line, and the advent of the new company will doubtless be welcomed by the trade. The personnel of the directorate is a guarantee of excellent management.

Sir Alfred Harmsworth has purchased a location in Newfoundland for his pulp mill. The areas embrace two thousand square miles excellently wooded. Part of this territory is already being worked by the Timber Estate Co., of which Henry M. Whitney, of Boston, is president. This concern has large sawmills, twenty miles of railway line, a shipping port and wharves capable of accommodating large ocean liners, and other properties, all of which pass into Sir Alfred's hands. Other tracts yet unworked adjoining the Whitney property have been acquired. The purchase price aggregates $450,000. Sir Alfred's corporation, known as the Amalgamated Press, Limited, of London, has been capitalized, it is said, for the purpose of operating the pulp mill enterprise at $10,000,000. A plant valued at half that sum will be established and work started as soon as possible, the intention being to enlarge the plant as rapidly as circumstances will admit. The special advantages which caused Sir Alfred to select Newfoundland for this venture are an abundance of timber, unrivalled water power from a series of lakes, cheaper labor than elsewhere in America, and sea transportation of the product for a shorter distance than from any other pulp making centre on this continent. His own railway will convey the product to tidewater at

Lewisport, in Notre Dame Bay, only 20 miles from the mills. From Lewisport to Liverpool the distance is only 1,720 miles, as against 3,300 from New York Deposits of limestone used in pulp making exist near the mills, and coal has been found in the vicinity.

LITERARY NOTICES.

Brusewitz "Nordisk Papperskalender," 1904, published by Hugo Brusewitz, of Göteborg, Sweden, is just to hand. This book of over 250 pages contains a complete directory of Scandinavian pulp and paper mills, including Sweden, Norway, Denmark, and Finland. A great deal of information is given about each mill, such as capital, driving power, machines, output, and reproductions of trade marks. The book is most attractive in its typographical and mechanical features, and is of convenient size and arrangement for ready reference. The text is entirely in Swedish.

The Bureau of Forestry of the United States is doing a grand educational work in showing the people the value of the timber resources of the country, and in making clear the importance of preserving and restoring the forests, H. M. Suter, one of the agents of the Bureau, has prepared a pamphlet on the forest fires of the Adirondacks in 1903, with a map showing the location and area of the region devastated by fire. It appears from this map that about a dozen large but disconnected patches were burnt over, and about forty smaller patches, many of them widely separated, were scorched, the aggregate area being about 600,000 acres, and the direct total loss approximately $3,500,000. This loss did not include any estimate of the value of the growth of young trees, which were to form the future forests of the affected areas. It is to be hoped that the provincial governments of Canada will make similar records of the work of forest fires, from the investigation of which information may be derived which will help in avoiding these wanton losses in the future.

K. Morven, of Florence, Italy, sends us some leaflets, issued to promote the Metric System of Weights and Measures. The Metric System is founded on our decimal system of notation, and being so founded is the only system of weights and measures suited for universal use. Since its introduction in France, a little over 100 years ago, it has, by virtue of its own inherent advantages, extended from one country to another, till it is now used in forty-four countries. Even in Anglo-Saxon countries, it is now in common use in the drug, chemical and other trades, and it is believed that it will soon be made general in Great Britain and Canada.

Little & Walker, chemical experts and pulp mill engineers, 93 Broad St., Boston, have issued a valuable hanger for office use, containing in a condensed form much useful information for the mill engineer and chemist. It is copyrighted, but may be had free on addressing the firm. An extract will be found elsewhere.

Among the trade catalogues and circulars received are the following. Copies of these will, no doubt, be sent to persons interested on mentioning this magazine:

Waterous Engine Works Co., Brantford, Ont., manufacturers of pulp and sawmill machinery, also of steam engines. The present catalogue illustrates and describes the McEwen automatic engine, placed on the Canadian market solely through this company.

Leaflet from Cunliffe & Croom, Limited, Broughton Iron Works, Manchester, describing a patent type metal moulding apparatus for users of linotype machines.

John Haddon & Co., (Caxton Type Foundry), 124 York St., Toronto, catalogue of display rules.

Booklet describing the Oliver typewriter, the only standard typewriter invented by a Canadian and manufactured in Canada. It is stated that the present output of these machines is 100 per week —a remarkable record.

Westman & Baker, manufacturers of printers' and bookbinders' machinery, 78 Wellington St. W., Toronto. A booklet describing the firm's Gordon and other hand and power presses, paper cutters, rule cutters, card cutters, etc.

WOOD CELLULOSE — ITS MANY USES.

In addition to the great use of wood for the manufacture of wood pulp, there has arisen since the seventies a new branch of the industry, viz., that of the conversion of wood into cellulose. This substance served primarily as a substitute for rags and cotton in the manufacture of many kinds of paper, and its advent was hailed with the liveliest satisfaction by the whole world, seeing that ultimately the supply of cotton would not be sufficient for the large quantities of paper required.

Science and research have, however, revealed new methods for converting the stable cellulose into a small series of important industrial products, by its transformation, either by mechanical or chemical treatment, into new products which are acquiring an importance in the commercial world hitherto undreamed of. New products are continually being obtained from cellulose, and attempts are continually being made to discover further useful methods of application.

The following brief sketch of the uses and methods of application of cellulose, as far as they interest the members of the paper, pasteboard and wood pulp trades, may perhaps awaken an increased interest in them, and perhaps prompt individual efforts to help to add to the general fabric of this important branch of industry.

The cellulose obtained by various methods from wood and woody plants is, as is well known, employed for all sorts of paper and articles manufactured therefrom. The purest and most completely opened up form of cellulose fibre is, however, that contained in cotton wadding, and the manufacture of wadding and filter paper are special branches which demand the greatest care and the most scrupulous cleanliness both in the materials and water used.

Both the above products are put to a number of uses, and one of the most important qualities demanded of them is high absorptive power, as well as freedom from every possible impurity. In addition to their use for filtering and surgical purposes, these pure forms of cellulose have been largely employed of late years in the manufacture of nitro-cellulose, which substance is again worked up into a variety of important technical compounds., principally gun-cotton, blasting gelatine, smokeless powders, celluloid, and collodion, from which latter substance the so-called artificial silk is now produced.

The cellulose fibre produced from wood is still more absorptive than that obtained from cotton, and, as the result of much laborious research and experiment, it has now become possible to produce wood cellulose which can take the place of cotton cellulose—a fact which has opened up an entirely new market for the article, and one which is also increasing. Both filter paper and wadding for surgical dressings can now be made of good quality from wood cellulose—an achievement hitherto impossible. Both by mechanical as well as chemical treatment a whole series of valuable products may be obtained from cellulose, some of which may be briefly mentioned.

Various solvents are employed, which enable cellulose to be treated more conveniently. When the pure fibre is boiled with water, preferably under pressure, the cellulose dissolves, and there is first produced a dissolved hydro-cellulose, which can be subsequently converted into dextrin and sugar, and finally into alcohol by fermentation. This takes place much in the same way as with ordinary starch, which is also transformed into dextrin and then into sugar when boiled.

The simplest molecular chemical composition is exactly the same, both in the case of cellulose and starch, namely, $C_6 H_{10} O_5$, hence both have the same chemical appearance. This molecular composition, which is not yet, unfortunately, accurately known, may also be very much higher, e.g., $C_{12} H_{20} O_{10}$, i.e., $(C_6 H_{10} O_5)^2$, or may even be $C_n H_{10} O_5$ n times.

If now, therefore, as already mentioned, cellulose be treated with water for a prolonged period of time at a temperature

of, say, 40 degrees C., a dissolved hydro-cellulose will be produced which, when the solution is evaporated and allowed to cool, remains as a uniform horny mass, which may be molded into any shape by pressure, and is used and known under the name of "cellulith."

Cellulose is also dissolved by various acids, such as hydrochloric, sulphuric, nitric, and acetic acids, also by acetates. Alkalies, too, such as potash and soda, salts like zinc chloride, ammoniacal oxide of copper, and others, all dissolve cellulose. The pure cellulose dissolved in any of the above reagents can be recovered again by precipitation, and, on the various methods of treatment, it is generally a mixture of hydro-cellulose and oxy-cellulose which has to be dealt with.

HINTS FOR THE BLEACHING DEPARTMENT.

(From "Useful Data for Paper Makers," by Little & Walker, Boston.)

Good bleach should consist of a pure white powder in which any lumps, if present, should readily break down and leave no core. If the bleach is grey it indicates the use of poor lime in making. It should show on analysis not less than 36 per cent. available chlorine.

Water at 75 deg. to 80 deg. F. is best for bleach mixing.

With a good agitator, twenty minutes is ample to ensure complete solution. Longer agitation does no good and makes the sludge settle slower.

The sludge from one hundredweight (112 lbs.) of bleach will occupy about 5 cubic feet. It does not consist of undissolved bleaching powder, but of lime suspended in bleaching powder solution.

A good bleach solution standing 1 deg. Be. contains about one-half per cent. of active chlorine. One standing 5 deg. Be., about 2.5 per cent.

Bleach solutions deteriorate rapidly under the action of light and should be stored in covered tanks.

If you must use acid in bleaching, remember that a very little is just as effective as a good deal.

If you bleach above 100 deg. F. there is great danger that the fibre substance will be attacked.

The use of alum in bleaching is simply wasteful. Acid does the same work much more cheaply and effectively.

The cheapest and most effective antichlor is ordinary sulphite liquor like that used for cooking wood.

Over-bleached and tendered stock will turn yellow if dropped into a hot weak solution of caustic soda.

Small amounts of acid or bleach left in stock cause paper to go back in color and tender.

Don't pile moist pulp directly on a wet floor.

All the dirt on the floor will be drawn up into the pulp.

The actual shrinkage of rag stock in the single operation of bleaching ranges from 3 per cent. to 7 per cent., according to grade.

Well-cooked sulphite should not shrink over 3½ per cent. in bleaching.

Bleached fibres take dyes more strongly than unbleached.

To test stock for traces of bleach, rub a little starch into a paste with cold water, and pour the mixture into boiling water. When cold add a few crystals of iodide of potassium. This solution, dropped on the fibre, develops blue spots if any active chlorine is left. The stock tested should be cold, as heat destroys the color.

The sizing power, and consequently the quality and value of rosin size, depends on the proportion of free rosin dissolved in the rosin soap. In good size about 40 per cent. of all the rosin present is uncombined or free. Some mill sizes contain less than half this proportion of free rosin, and are correspondingly ineffective.

Some months ago an English firm asked for quotations from Canadian mills making a class of cardboard suitable for card indexes. Up to the present they have only received one quotation, and in this case the price was higher than prices from the United States. Surely some Canadian paper mill can supply this want at a figure that will compare with United States quotations.

BRITISH CHEMICAL MARKET.

There is now a steady demand, and quotations are firm.

Alkali, ammonia, 58%	£ 4	15	0
Alum, lump, loose	5	5	0
Alumina, sulphate	3	10	0
Borax, crystals	13	0	0
Caustic, white, 76%	10	10	0
Caustic, white, 70%	9	15	0
Caustic, white, 60%	8	15	0
Soda ash, carbonated, 52%..	6	2	6
Soda ash, carbonated, 48%...	6	0	0
Soda ash, caustic, 48%	6	5	0
Sal ammonica (1sts)	42	0	0
Sal ammoniac (1sts)	42	0	0
Soda crystals	3	2	6
Sulphate of ammonia	11	17	6
Sulphate of copper	19	10	0
Sulphur, rolls	6	12	6
Sulphur flowers	7	12	6
Sulphur, recovered	5	10	0
Bleaching powder, 35%	4	5	0

PULP AND PAPER MARKET.

Since the close of the strike in Wisconsin, business in the West has been picking up. Fall trade is felt now to a considerable extent, and all mills have fairly good orders. The pulp market is about the same, and the demand is good.

There is a possibility of another shortage of ground wood in Maine, unless there are good fall rains. In the Adirondacks, owing to the expenditure by the Forest Commission of large sums of money on reservoirs, water has been very fair. A seeming scarcity of ground-wood, however, is being felt in some parts.

Prices are holding rather stiff, and pulp is none too free; $15 and $16, f.o.b. mill are the ruling prices, and these will probably go somewhat higher. Not only is it a question of water, but the prices of wood are holding very firm.

Canadian trade generally is good.

In Scandinavia great uneasiness is felt

by pulp manufacturers on account of the scarcity of water. Some pulp mills have been forced to shut down and others are running only partially. Even the western part of Sweden, which in normal years is never subjected to any shortness of water, is affected. The consequence is that pulp prices are holding firm. A stiff market is expected for some time to come, on account of the expected bad state of the waterways in Scandinavia during the coming winter. Water scarcity in Germany also is said to have had a great effect on the trend of the market.

New York reports quote ground wood at $16 at mill, but no sales are being made. Foreign bleached sulphite, $3.35 per cwt.; unbleached, $2.15 to $2.25; domestic sulphite, bleached, $2.50 to $3.25; unbleached, $1.85 to $2.10; domestic soda, bleached. $2.25.

In Great Britain, sulphite, bleached, is quoted at £12 to £12 5s.; unbleached, 1st quality, £9 to £9 10s.; soda, unbleached, 1st quality, £8 to £8 5s. Ground wood, 50 per cent. moist, £2 to £2 2s. 6d.; dry, £4 5s. to £4 10s.

PAPER STOCK MARKET.

Montreal, Sept. 15th, 1904.

There is a fair demand for most lines of paper stock. Prices of European stock continue firm, and with wood pulp here held at fairly high prices, paper makers are making more enquiry for waste material.

All the better grades of new cotton cuttings are closely bought up. Old cotton rags are a little dull. Manilla rope is firm, and in good demand. There is a good deal of enquiry for waste papers, and the better qualities, such as white shavings, ledger stock, etc., meet with ready sale. There is still no sale for old bagging. Considerable importations of rags for roofing stock have been coming in all summer, and the domestic supply at present is somewhat in excess of the demand.

Domestic white rags	$2.00 to	$2.10	per 100
Mixed bagging	55 to	65	"
Blues and thirds ...	1.25 to	1.30	"
Dark cottons	75 to	90	"
Roofing paper stock	50 to	55	"
Waste papers	35 to	45	"
Hard white shavings	2.00 to	2.10	"
Soft white shavings.	1.00 to	1.50	"
Book stock	75 to	90	"
Manilla rope	1.75 to	2.00	"
Sisal and jute string	75 to	1.00	"
Flax tow	1.00 to	1.25	"

ABITIBI SPRUCE.

Archibald Henderson, one of the surveying parties now exploring for the Provincial Government in New Ontario, writes to the Globe, as follows, on the timber around Lake Abitibi: "Along the rivers, and for the most part the creeks also, the country naturally appears at its best. The most valuable timber, as also the soil promising most for the agriculturist, is here found. White spruce as large as thirty-two inches in diameter, averaging sixteen inches, aspen and balsam poplar, some twenty-eight inches, averaging fourteen inches, are the most valuable trees. Mixed with these are the smaller black spruce, white birch and balsam. Such a forest unfortunately extends from only two or three chains to half a mile inland from the water front. This is not as serious as might seem at first, however, as the whole country is drained by numerous small unnamed rivers and creeks, as yet not marked on any map, besides the large rivers, and each of these, as a rule, has sloping banks, in some cases from thirty feet to forty feet high, and timbered almost as well as the usually somewhat higher banks of the larger rivers.

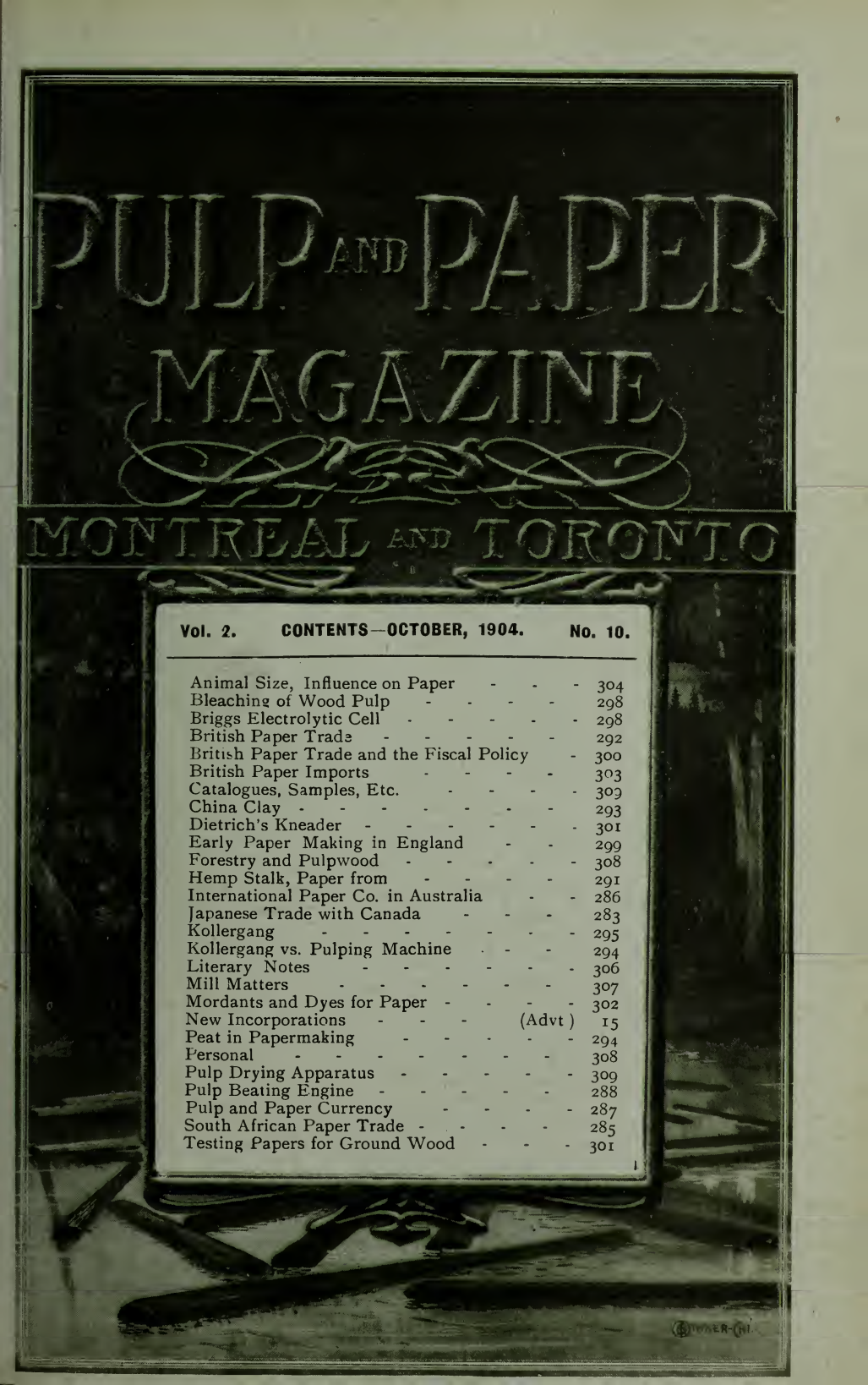
"Inland from the rivers and creeks the character of the country changes very considerably, and in various areas assumes far different aspects. By far the greatest part is well wooded with black spruce, in size up to thirteen inches, averaging probably seven inches. These grow on a

clay soil overlaid with two or three feet of humus, which again supports moss to the extent of about eight inches. Many of these spruce woods are quite wet, and the mossy floor is of a sphagnous nature,

while in other drier localities the floor is largely composed of Bryaceous mosses. Scattered through the black spruce are many tamarac, which in wetter areas are collected into tamarac swamps. These trees, unfortunately, are dead, almost without exception, having been killed within recent years by the larch sawfly in these areas. Hoary alder has grown up very thickly, and travelling through it is almost impossible. Such areas are small, the largest being not more than a mile and a half long in the direction travelled."

In reply to a question, we may say that tubes and cones of paper may be imported free by manufacturers of cotton yarns, when used in their own factories.

The Oriental Power and Pulp Co., of Vancouver, whose projected works have already been mentioned, will make both mechanical and sulphite pulp, which will be turned into paper at their own mills. The company has extensive timber limits of spruce, larch and hemlock in easily accessible localities.



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The St. John (N.B.), Gazette ceased publication on October 1st, and is succeeded by the St. John Evening Times. The property has passed under the management of a new company, which is now applying for a provincial charter, the corporate name to be the St. John Times Printing and Publishing Co. The capital will be $100,000.

La Compagnie de Publication de La Patrie has been authorized to increase its capital stock by $200,000, and has been granted the following additional powers: To acquire the assets of the firm of L. T. Tarte & Frere; to buy the property of the newspaper, Le Cultivateur; to print and publish newspapers, books and other publications; to carry on a general job printing business, binding and lithographing; make and sell pulp paper, and to buy and sell journals, books, pamphlets, magazines, and other publications.

—Supposing a tax of 10 per cent. be placed on paper imported from foreign countries, and a smaller tax on paper sent to us from Canada, would it in reality do injury at all comparable to the benefit that would ensue to the papermakers of England? Would it seriously affect the price of the volumes that line the booksellers' shelves, the wrapping paper on the shopkeepers' counter, or the size of the evening newspaper? Anything that would interfere with the dissemination of literature would not be tolerated, but it is a striking commentary that at the present time the newspaper owners of the United States are paying £2 a ton more for their paper than are the newspaper owners of this country! Yet America is the land of big newspaper sheets, big circulations, as well as big everything else. The demand for books is possibly greater there in proportion to the population than it is at home, so that here, at all events, is at least one striking proof that £2 per ton does not stand in the way of the printing trade and the circulation of books, papers, and periodicals in America.—Belfast Telegraph.

THE
PULP AND PAPER MAGAZINE OF CANADA

VOL. 2.—NO. 10. TORONTO, OCTOBER, 1904. { $1 A YEAR. SINGLE COPY 10c

Pulp and Paper Magazine

A monthly magazine devoted to the interests of Canadian pulp and paper manufacturers and the paper trade issued between the 15th and 20th of each month.

SUBSCRIPTIONS: Canada, Great Britain and the United States, $1 a year; to Foreign Countries, 5s. a year.

Changes of advertisements should be in the publishers hands not later than the 10th of the month, and, where proofs are required, four days earlier. Cuts should be sent to the Toronto office, by mail, not by express.

BIGGAR-SAMUEL, LIMITED,
PUBLISHERS
18 Court St., TORONTO. Fraser Bldg., MONTREAL

JAPANESE TRADE WITH CANADA.

Recent trade returns of Japan show that so far from the war causing a paralysis of trade, the exports of the "England of the East" have actually increased since the war broke out, and would no doubt have increased much more if the calls to arms had not depleted the labor supply. In Canada, the States and in British and European countries Japanese goods are in favor, the heroism of the Japanese soldiers and their chivalrous conduct towards their foes being in reality an advertisement of the best kind for Japanese goods. The Japanese always were natural born artists, and their artistic taste shows itself in all their wares. Their confidence in the permanency of their military success in Manchuria is evident from the fact that the Yokohama Specie Bank has opened a branch at Dalny, and reopened its former branch at Newchwang.

Among a number of articles of Canadian origin which can find a market in Japan is pulp, and, to some extent, paper made from wood pulp. Alexander MacLean, the Canadian agent in Japan, is sanguine on this subject, and we commend to those interested the following information given in his last communication to the Canadian Government.

"Pulp imported into Japan," he says, "is a growing quantity. The importations for the last six years have been in value as follows:—

Years.	Pounds.	
1898	9,192,994	$111,800
1899	8,716,184	168,325
1900	8,873,517	227,565
1901	3,979,576	102,795
1902	8,293,804	182,529
1903	16,042,116	313,569
Total	55,098,191	$1,106,583

The principal pulp exporters, by countries, to Japan, for the last three

years are: Germany, Sweden and Norway, the United States and Great Britain. Austria-Hungary and British America supply a small quantity; but doubtless some of the latter's product comes through Great Britain. The returns show a rapid rate of increase for the three years just preceding the war period, which may therefore be regarded as normal. No doubt this year will show perhaps more than a normal increase, because of the greater consumption of paper, mainly newspaper which the demand for war news causes. But the expectation is that the demand for pulp especially for newspaper purposes will go on increasing. British America, the greatest pulp raw material country in the world figures very modestly as a contributor to Japan's supply of pulp. With shortness of distance, directness of route, and with unlimited raw material, it seems to me that the Canadian pulp manufacturers should figure more largely here.

The houses in the trade at Yokohama are substantial. Many of them express themselves as ready to receive quotations from Canada. I am now forwarding to the department at Ottawa, samples of the pulp that meets the demand in this market. The pulp mostly sold here is shown in samples marked A and B, and costs, duty included, laid down in Yokohama:—

A. Yen 124.00 ($62) per ton, 2,240 pounds.
B. Yen 94.00 ($47) per ton, 2,240 pounds.

All pulp sent here should be in sheets, thoroughly dried before packing, and put up in bales of about 200 pounds, or 8 or 10 to the ton. The paper mills here object to damp or wet pulp. Their plan is to put it into drying rooms and to weigh after drying, and to pay only for the dry weight. Quantities have been known to fall off ten per cent. by this treatment. There is thus a shortage to be accounted for between the pulp mill and the paper mill; and the dealer's complaint is that it falls upon him, and that the sharp competition does not enable him to afford it."

While there is a good opening for Canadian pulp in Japan, there is an equally good market for Japanese native papers in Canada—such for instance, as the papers made from the mitsumata fibre described in recent numbers of this journal. We have in the office of the Pulp and Paper Magazine a sample of this paper used as the wrapper of one of our Japanese exchanges, the monthly journal of the Yokohama Chamber of Commerce. We had the strength of this tested, and the result was that it was shown to have four times the tensile strength of any United States or Canadian paper of the same weight and made for like purposes. It is remarkable alike for its pliability, lightness and strength, and for special manufacturing purposes, it should find a distinct place here. Canadian makers of paper fabrics could add very much to their output by adopting new sources of supply, such as this, and in turn could do an increased export trade by skill in utilizing foreign raw materials specially adapted to their work. The uses of paper and pulp in the industrial arts are still extending, and these uses can be further diversified by using raw materials more precisely suited to these specialties.

The Trois-Pistoles Pulp and Paper Company has been authorized to increase its total capital stock to $300,000.

SOUTH AFRICAN PAPER TRADE.

The condition of trade in South Africa is causing alarm in many quarters. The trade returns for the first half-year of 1904, compared with the half-year of 1903, show a decline of between 30 and 35 per cent. in the Cape Colony, Natal and Delagoa Bay. It is still to be remembered that it is more than equal to the greatest of the boom periods before the war. There is a further consolation that while British trade in general with South Africa has shown a decrease in the first six months of this year, the trade of other countries there has suffered still more. For instance, while the exports of Great Britain to South Africa declined from £14,563,528 to £9,816,777, the exports of the United States dropped from £553,663 to £226,-733, and those of Germany fell off to one-half. Taking the paper trade by itself the situation is noteworthy, and should be observed by Canadian paper manufacturers. British exports of writing, and printing papers, and envelopes declined from £163,713 in the eight months ending August, 1903, to £108, 595 in the eight months of 1904, the decline in the other classes of paper being from £40,737 to £31,828. In the case of Germany, the values are not given in the reports to hand, but the tonnage of paper exports to South Africa rose from 46 tons to 47 tons. United States shipments of paper also show an aggregate increase. The U.S. official returns show that exports from that country to British Africa in books, maps, engravings, and other printed matter were $33,540 in the eight months of 1903, and $25,625 in the eight months of this year, a decline which was more than made up in the trade in "paper and manufactures of" in which United States exports to British Africa were $61,238, in the eight months of last year, and $78,366 in the eight months of 1904. The South African record shows a still greater advance than the United States figures, the imports of paper goods from the United States being put at £50,577, in 1904, against £16,427, in 1903. If in the face of so great a decline in the paper trade of Great Britain, the United States and Germany can score an increase, there should be an opening for certain lines of Canadian paper and paper products. It is possible that one cause of the decline in British and the increase in United States and German paper trade is the exorbitant freight rates charged by the shipping combine, which now seems to have South Africa in its grip. The rates from New York, as well as from Hamburg, are much lower than from British ports, and this doubtless encourages the efforts of United States and German exporters, but there are other causes at work similar to those which have resulted in so marked an advance of United States, as compared with British, exports of paper to other countries. To Great Britain herself, the United States has sent a total of $1,613,111 in paper and paper goods in the eight months of 1904, as against $1,204,033 in the same period of last year, while on the other hand United States imports of Great Britain only increased from $550,397 in the eight months of 1903, to $586,540 in 1904.

There must be something exceptional in the trend of the South African paper trade since most other branches of United States and German trade with those colonies have suffered the same decline in the past year as those of Britain and other foreign countries. We have shown in recent issues the causes of the decadence of

British trade with Canada in paper in the past twenty years—though the preferential tariff is now slowly turning the tide back—and possibly the same causes are at work in South Africa.

THE INTERNATIONAL PAPER CO. IN AUSTRALIA.

The remarkable growth of United States paper reports to Australia in recent years has not been maintained latterly. Official statistics show that United States paper exports to Australia in refactures to British Australasia, which were $1,162,375 in the first eight months of 1902, dropped to $871,686 in the corresponding period of 1903, and further down to $646,619 in the eight months of 1904 After several years of noteworthy expansion, what were the causes of this falling off? It is possible a clue may be furnished by a letter from Sydney, which appears in the last issue of the World's Paper Trade Review, as follows:

"A case now before the N.S.W. law courts that is causing considerable interest to the trading community, is one in which two paper firms of world-wide reputation, viz., James Spicer & Sons, of London, and the International Paper Co., of New York, are the litigants. The American Trust is run in Australia by a sole agency—Carmichael, Wilson & Co., Limited, a company which was specially formed to handle the American Paper Trust's products some three years ago, and who, by the system of deep cuts, were selling paper at a lower rate in Australia than it could be purchased in New York. Their expressed intention was to freeze the handlers of British and Norwegian paper out of the Colonial markets, and then, when the track was clear, put up the price again. However, such a policy is not always successful; and these supposedly smart people fell in their own traps, for when the agents for other mills dropped to the tactics of their Trans-Pacific friends they hit upon a system of making their opponent pay for the fat he was going to fry his fish in, and forthwith made large contracts with the International at the cut rates through their Sydney representatives and distributors. In the meantime, big forest fires, drought, and labor troubles in the home market had sent the price of pulp up with a run; and when these big contracts arrived in New York the International Paper Co. refused to ratify them, with the result that James Spicer & Sons, who had given a big order, entered an action against them to recover £5,000 for breach of contract."

The defendants applied to have the writ of summons dismissed on technical grounds, among others being the plea that it did not occupy premises there, exposed no goods there for sale, and had none of its employees there, and that Carmichael, Wilson & Co. only acted for it in a limited way. The judge was of opinion that Carmichael, Wilson & Co. were carrying on the business of the defendant company, and the application was dismissed, with costs. The action will, therefore, go on and its outcome will be waited with interest on both sides of the water.

It may be remarked that the total British paper exports to Australasia were £233,017 in the eight months of last year, compared with £288,004 in the like period of this year, from which it would appear that British makers are recovering at least a part of the business that had been captured by United States manufacturers.

—To convert absolutely dry fibre into air-dry on 10 per cent. basis, divide the percentage or weight of absolutely dry fibre by 90 and multiply by 100.

Pulp & Paper Currency

On the troubles from static electricity in paper, a remedy for which was mentioned in last issue, Henry Rogers, an electrical engineer, writes to Paper and Pulp that the drawback to the proposed remedy is that only those mills using alternating current can avail themselves of the remedy. Mr. Rogers says he has a much simpler apparatus which can be fitted to a machine and will take out every particle of electricity from the paper. Mr. Rogers does not explain his process, but says he will give further information to enquirers.

One of our United States trade exchanges recently made the statement that the Orr Felt & Blanket Co., of Piqua, Ohio, had the largest loom in existence. This loom was used for making pulp felts, and was 380 inches wide. As this statement has been repeated in British and continental papers, and appears to be accepted there as the record of the biggest thing in looms, we may be permitted to remark that we have in Canada a loom that "overtops the blue Olympus" in this line, and makes the United States Ossa like a wart. The firm of Hamelin & Ayers, of Lachute, Que., has three big felt looms, the largest of which is 603 inches wide in the reed—that is it will weave a piece of cloth 50 ft. 3 in. wide—this mammoth machine being 60 ft. over all. It has woven pieces of cloth 95 ft. long. These looms have been in steady operation for the past three or four years, and were devised and equipped in Canada.

One of the most lamentable features of the late discussion of the rossed wood cases in the United States was that no one could tell the derivation of the word "rossed." It is not in the Century dictionary, it is not in any of the cyclopedias, it is not even in our revered Webster which settles most questions with such authority. No witness on the stand or authority in the trade could throw light on the subject, and it is probable that if the lawyer on the losing side could have furnished a timely explanation he would have won his case. The Pulp and Paper Magazine has investigated the matter, and is now able to give the origin of the word. It was picked up by the pulp men from the French-Canadian lumbermen, and is simply the Anglicized form of the French "raser" to shave. It is pronounced raw'-zay, and hence the word rossed, for peeled pulpwood (bois rasé) was naturally evolved. It has been adopted into colloquial English in the same way as the word frazee (frazil) has been Anglicized to describe the slush ice that forms in our rivers in clear zero weather.

South African papers are much interested in the reports of the native Cape fibres, samples of which have been made into paper at the Peter Culter Mills, in Scotland. One of the papers states that a plentiful supply of asparagus grass is available, as well as china clay, and that facilities for manufacturing exist. There is one requisite for paper and pulp making, which South Africa does not possess, and that is water powers which can be depended on the whole year round. The smaller rivers are raging torrents one season and dry or nearly dry in another season. The perennial water power streams are few and not often well situated for railway facilities. The market for paper is certainly a good one in South Africa, and no doubt mills for the production of

such paper as can be made from waste will have a good prospect. The matter of prime importance is the character of paper which can be produced by the newly discovered fibre. If this should prove satisfactory, and if the supply of the plant is plentiful in its wild state, or can be cheaply cultivated, there may be opened up a great prospect for its export to the paper mills of Great Britain, or its manufacture in South Africa, or both.

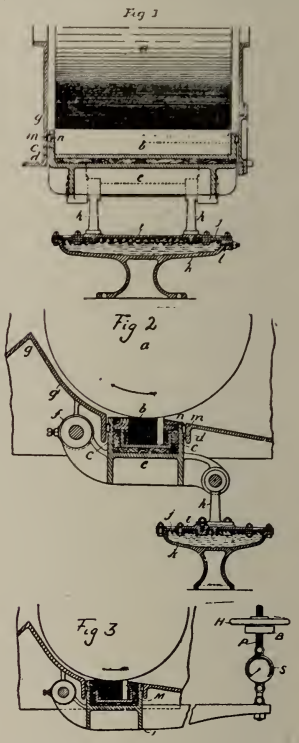
PULP BEATING ENGINES.

John White, of Edinburgh, Scotland, has been granted a patent on a pulp beating engine.

The inventor says: "This invention has for its object to provide simple and efficient means for training or adjusting the knife plate in relation to the beating roll in substitution for the usual means of training the roll to the plate. With the existing arrangement of adjusting the roll to the plate it is difficult for the attendant to determine with what pressure the roll bears on the plate. As beating engines are almost invariably driven from below, when the roll in the existing arrangement is lowered onto the plate the distance between the centre of the roll and the centre of the driving shaft is shortened, thus slackening the belt when the roll is in contact with the plate and tightening the belt when the roll is not in contact with the plate. My arrangement obviates all these difficulties, as the attendant has only to look at a hydraulic gauge connected with a water chamber, which acts on the plate box in order to ascertain the pressure which the roll exerts on the plate instead of using the crude and uncertain methods now in use to determine this. Further, as the roll remains in a fixed position, the distance between the centre of the roll and the centre of the driving shaft is never altered."

In the accompanying drawings, which illustrate the invention, Fig. 1 is a longitudinal section, and Fig. 2 is a cross section, of part of a hollander or beating engine, showing the means adopted for adjusting the knife plate in relation to the beating roll. Fig 3 is a view corresponding to Fig. 1 and illustrating a modification.

The beating roll *a* is held in a fixed position in stationary bearings or the existing roll lifting mechanism may be utilized to bring the roll down when excessive wear has taken place on the bars of the roll and plate; but according to the invention the knife plate *b* is made adjustable. The plate *b* instead of being



fixed to the "den" of the beater is carried in a plate box *c*, which, as shown, may form part of a beam or beams *e*, hinged or pivoted at one end on a bracket *f*, which may be conveniently fixed under the backfall *g'* of the beater trough *g* or at any other suitable point,, while the opposite end is carried by a link or links *h* (which may be adjustable), on a resilient support. This support consists, preferably, of a plate *i*, secured to the diaphragm *j*, of rubber, leather or other material, secured on and forming the cover of a box or chamber *k*, to which water or other

fluid is admitted under suitable pressure to bring the plate *b* into contact with the roll *a*, the diaphragm plate *i*, to which the free end of the beam *e* is adjustably connected by the link or links *h*, being free to move vertically to raise or lower the knife plate *b* of the beating engine through an opening *d* in the bottom of the trough where the usual den is formed. When it is desired to take the plate *b* off or out of contact with the roll *a*, an outlet *l* for the fluid in the water chamber is opened and the water allowed to escape, whereupon the beam *e* and plate *b* descend by their own weight and may be brought to rest upon an adjustable stop on the water chamber.

In order that a water tight joint may be formed between the sides of the plate box *c* and the orifice *d* in the bottom of the beater trough *g*, through which said box passes, a packing *m* is fitted around the orifice, the said packing being composed of one or more endless tubes, of rubber or other like material, held in recesses or cavities *n*, prepared for them in the plate box or in the beater trough and inflated with air, water, or other fluid or supplied with fluid by a connecting pipe or hose from an overhead tank. As will be observed, no part of the lever *e* can come into contact with the stuff.

In the modification of the invention, shown in Fig. 3 the pressure is regulated by a spring balance and screw instead of by the hydraulic arrangement above described. The knife plate and plate box M are carried by the pivoted lever L, the other end of which is resiliently supported from the bracket B, being connected thereto by the spring balance S and the screw P, which latter is controlled by the hand wheel H.

Another type of beating engine, recently patented in the United States by James M. Miller, of Hoosick Falls, N.Y., is described as follows: This invention belongs to that class of pulp beating engines in which a beating roll is placed at each end of a long tub or vat, and the stuff being operated on is passed from end to end of the tub through separate but contiguous channels, each of which is so designed that it takes the stock as it is delivered from the top of one roll and carries and delivers it to the other roll at the bottom of the tub, whereby differential rates of velocity are avoided. The beds of these channels are so warped or twisted as to compel a thorough intermixture of the stuff as it passes over them, but offer no serious obstacle to the free and rapid circulation of the contents of the tub. The objects of the invention are to promote homogeneous mixture of the stock and its rapid circulation around the engine, whereby an increased output is obtained.

Fig. 1 exhibits a top view of the invention. Fig. 2 is a side elevation of same, which also shows a partial vertical longitudinal section of the same, taken on the line A B C of Fig. 1. Fig. 3 is a diagonal vertical transverse section of the tub, taken on the line D E of Fig. 1.

The invention is embodied in a tub 1, in each end of which is mounted in operative position a beating-roll 2, and bedplates 3. These are of the ordinary construction. The rolls are covered with hoods 4, to confine the flying material as the engine is operated. On the side of the roll toward the middle of the tub is an apron 5, which operates much as the ordinary backfall to receive the pulp from the roll. Next to the roll this apron is flat, and its receiving edge is parallel with the blades of the roll; but as it slopes toward the centre of the tub it takes on a concave shape, as shown in cross-section in Fig. 3, the lowest part of the channel being one side of its centre, as at *b b*, Fig. 1. Thus, a spiral form is given to the bottom of this apron designed to impart to the current running over it a diversion from its otherwise direct line of movement toward the opposite side of the channel. By these aprons the tub is horizontally divided into two channel-ways. The upper one is transversely divided by a diagonal mid-feather 8, which forms one of the side walls to the channel of which the apron forms the bottom. The under channel is also diagonally divided by a partition 6, which runs transversely across the mid-feather 8. The front end of each

apron rests upon the top of this partition, which is shaped, as seen at *c* in Fig. 2, to promote the easy and rapid flow of the pulp over it. Thus, its upper edge acts as the brink of a dam to which the pulp is carried by the apron and over which it breaks and abruptly descends into the vortex below, formed between the side walls of the tub and the partition 6. In order not to obstruct the ready flow of the pulp from the apron through the under channels, the walls of the tub are expanded, as seen at 12 12, so as practically to preserve the whole width of the apron-way down through to the entrance into the under passage.

From the foregoing it will be seen that on each side of the tub at the middle where the two currents pass each other, two sinks, 7 and 10, are formed, into which the pulp from the aprons is poured and out of which there are openings under the mid-feather 8 into the under channel leading to the under side of the roll. In their action these sinks are in the nature of mixing pools. This results from eddies set up therein due to the crossing of currents as the stuff is delivered thereto from opposite sides or from the centre of the mouth to the apron 5.

It will be seen from the indication of the feathered arrows, that pulp from the right bank or side of the apron will be forced away from the mid-feather toward the opposite side and will pass into the vortex or pool over the mouth of the apron, with an impulse which will carry it toward the curb of the tub, while the pulp on the apron nearest the left wall will pass over the mouth of the apron and sink into the inner angle of the pool, as at *d d*, and thence pass out into the under channel at the bottom of the tub below and athwart of the current defined by the feathered arrows. Thus, the conflicting currents set up in these sinks are intended to effect a thorough intermixture of the stock before it passes to the rolls.

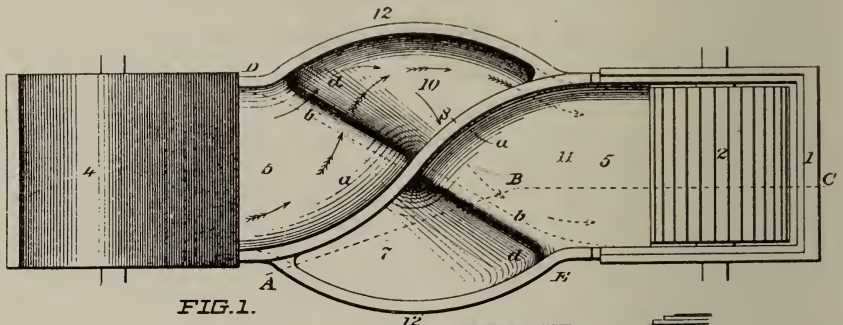


FIG. 1.

FIG. 3.

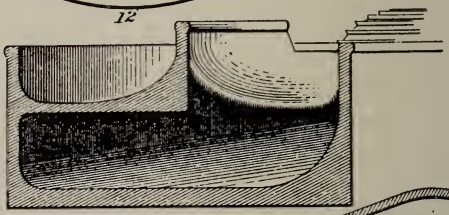
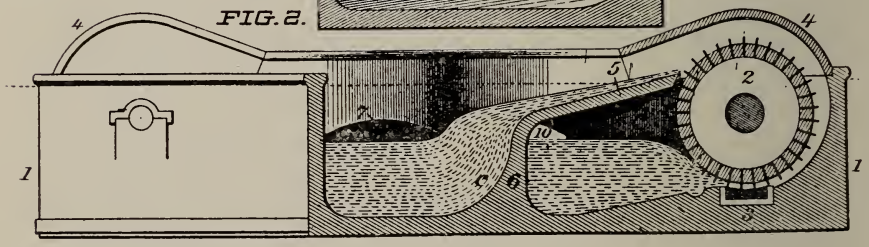


FIG. 2.



An illustrated weekly, called the Manitoba Graphic, has been started in Winnipeg. Herbert L. Dore is editor and publisher.

PAPER FROM REFUSE HEMP STALK.

In a recent article in the World's Paper Trade Review, Saverio Ragno, engineer, referred to the value of refuse hemp stalk as a papermaking material, and advocated its more extensive use in Italian paper mills. He is of opinion that the special qualities might with advantage be used in the place of straw and wood. Hitherto attention has only been given to the production of packing paper from hemp stalk, but Mr. Ragno, in view of the important place the material occupies in the agriculture of Italy, considers that it could be profitably employed in the manufacture of the better qualities of paper. Some interesting particulars are supplied of the utilization of hemp stalk at the San Cesario Mill.

Boiling.

The works contain five cylindrical boilers, 13 feet deep with a capacity of about 706 cubic feet. They are utilized either for hemp stalk or straw, a milk of lime being employed. A jet of steam heats the bottom of these boilers at a pressure of two atmospheres and the operation of boiling takes 36 hours.

When treated cold hemp stalk requires 14 to 15 days in summer and 20 to 22 in winter, whereas in the case of straw the time is only seven to eight days, and ten to twelve days respectively. It must not be concluded from this that the treatment of the stalk is more expensive than that of straw, because the volume occupied by the two materials being the same, a greater weight of hemp stalk is produced in hot or cold treatment than of straw, as the density of the stalk is greater. Consequently to obtain the same weight of stuff it will take as long with straw.

For hemp stalk lime is preferable for cold treatment, and more so for boiling. The proportions of milk of lime to employ for ten parts of hemp stalk should be 1½ to 2½ (in the case of straw 1 to 1½ suffices). After boiling or cold treatment, completion of which is ascertained by taking a piece of the stalk between the fingers and crushing it, noting whether it is of a uniform reddish color in all parts, the stuff is removed and left in a heap for a day or two according to needs of work and then ground in the mill.

There is, therefore, no difficulty in preliminary treatment of the stalk.

The Myallonier Washer.

The San Cesario Mill, points out Mr. Ragno, is conducted on very scientific principles. There is a special washer for hemp stalk, invented by the director, and based upon the same principle as that constructed by M. Lespermont for washing straw with soda, which is again extracted from the wash water. In the San Cesario washer there are a number of tanks through which the hemp stalk is conveyed in the opposite direction to flow of water, and in spite of the fact that all the water is lost, the system involves limited expenditure and gives perfect washing. The machine works with great regularity and requires no special attendance. It is very economic and superior to a Hollander, all traces of lye, precipitated soap, etc., being eliminated with very little water. This washer has cement sides, and the capacity is sufficient for a production of about 39 cwts. of packing paper per day. Exterior dimensions are 13 feet by 11 feet. The water inlet cock being regulated for the above production so as to give 32 gallons per minute, washing is perfect, as the stalk when it falls into the drip chamber is free from all foreign matter and traces of lime.

Grinding.

To grind into pulp for packing paper, an ordinary mill is used with smooth stones. At San Cesario there is only one type of mill, which is a disadvantage. It would be well to have roughing mills and others to refine the pulp for a better class of paper. The employment of a system like the Simonet was also tried, but results were not satisfactory. This phase of work invites improvements. The operation of grinding the stalk requires about 25 per cent. less work than with straw. At San Cesario a fairly uniform half-stuff is obtained in three to four hours, which is at once sent to the refining rolls.

An Auto-Mixing Cylinder.

M. Myallonier, the director of the San Cesario mill, has invented and patented what is called an auto-mixing cylinder, which, with the washer previously described, is indicative of an intimate knowledge of this particular system of paper-making, to the study of which the inventor has devoted many years. According to Mr. Ragno the auto-mixing cylinder, compared with the chief types of machines now employed, seems scientifically constructed and must evidently realize great economy of power; it has already given excellent results. It consists of an ordinary trough divided into two compartments communicating with each other on one side only. It is furnished with one or several bed-plates, and a cylinder with blades at one end of the longest compartment. The pulp, instead of falling into the part opposite the entrance of the cylinder, falls on the same side into a gutter at the top part on a level with the pulp in the trough compartment which it enters. The pulp passes to the top part of the cylinder maintained by a cover. Thus the centrifugal power it acquires in passing between the cylinder and bed-plate is utilized, and without any great expenditure of motive power. The pulp which drops into the trough is carried away owing to the inclined surface on the bottom of this trough and is thoroughly mixed. Thence it flows into the first compartment to fall under the cylinder, and so on until refined completely. With this system one can also construct beating engines with several cylinders and three gutters, or making the pulp issue from the sides of the cylinders. In this new engine the pulp is rapidly and automatically mixed and flows quickly down the inclined plane in the compartment. Consequently it is ground more quickly than in the ordinary Hollander, and without any of the inconveniences associated with the latter. A much denser pulp can be treated than in the Hollander beater. Coloring and sizing likewise require very little time. Needless to add, the machine can very easily be managed by a workman, and consequently it is free from all the ordinary defects. The pulp being more evenly ground, work is executed more carefully and gives finer products. The roll can be cleaned for change in manufacture and coloring much more easily than in any other type of beater. The time requisite for beating at the San Cesario Mill is two to four hours, according to the kind of paper to be made; packing or fine qualities.

Experiments in Bleaching and Coloring.

Hemp stalk is not bleached at either the San Cesario or Panzano Mills, but numerous experiments have been conducted. Mr. Ragno points out, however, that both in the case of bleaching and of coloring it would be unjust to refer to the developments made.

At San Cesario the experiments constitute a trade secret, especially as regards coloring, some tints being difficult to obtain. At the Panzano Works, where hemp stalk is also utilized, only yellow, brown and blue paper is made, whereas at San Cesario various tints, red, etc., are produced. Mr. Ragno hopes that his observations will induce others to go deeper into the question, directing their attention rather to the mechanical phase of the subject, which is the main point.

BRITISH PAPER TRADE.

(Correspondence of the Paper Mill.)

The condition of the paper trade in England is fairly steady, and the demand for employment is well maintained. Out of 2,398 union members the unemployed at the end of last month was 3.2 per cent., practically no change compared with the previous month. A slight improvement is shown compared with a year ago when the percentage of unemployed union members was 3.5 per cent. In Scotland there is very little cause for complaint, although there is no great activity apparent. The Board of Trade received returns from twenty Scottish firms, and it appears at the end of last month they employed 3,855 work people, whereas in the previous month the number was 3,814, and a year ago, 3,788.

The situation in Scandinavia in respect to the scarcity of water has not been relieved to any extent by recent rains, and it is feared that the winter months will show, at least in Norway, a water famine. Already prices of mechanical show an advance. Chemical wood pulps are very firm, this year's production and a large quantity of next year's production being sold. At a meeting of the Scandinavian Association of Cellulose Makers, held recently in Christiania, it was decided not to advance prices, which are officially quoted by the association as follows: £8 for ordinary, and £9 for easy bleaching pulps, c.i.f., London. The cellulose makers have agreed to establish an office in Gothenburg for the collection of statistics dealing with production, stocks, etc. Perhaps later on another attempt will be made to control sales.

In some parts of Germany a dry summer has also been experienced, and paper makers have had to import increased quantities of wood pulp from Scandinavia, as cost of production has been increased, and owing to the good demand for paper, an agitation is now on foot to secure an advance in prices. In Austro-Hungary the water conditions have not been altogether favorable, and the organization of paper makers has resulted in an agreement to put up the prices of paper 10 per cent.

If all the reports were true of the alleged huge purchases of Sir Alfred Harmsworth in Canada and Newfoundland of timber lands, one would imagine that his intention was to supply the world with wood pulp and paper. His recent trip to Canada led him, according to information now being circulated, "to invest a million dollars in a pulp plant in Newfoundland, and to buy $400,000 worth of forest from which to make paper to print his publications on."

No doubt definite information will be published in due course as to the programme of the Harmsworth firm, as it is well known that the interests represented by Sir Alfred Harmsworth, have had under consideration for some years past the building of pulp and paper mills—Scandinavia, Canada, Newfoundland and British Columbia, all being mentioned as possible locations. Meanwhile it is said the firm has made a five years' contract for the supply of news for printing the Daily Mail. The Holman-Hellefos Company, of Drammen, Norway, have, it is said, booked the order, the price being 1d. per pound.

It is well known that for several years past British paper has lost ground in Australia, owing to the increased demand for the American product. Statistics dealing with the current year, however, show the British exportation to Australia in a more favorable light, and as a consequence there has been a falling off in the receipts from the United States. The official returns relating to the United Kingdom show an exportation during January-August of paper (not including hangings and bags), to Australia, of the value of £211,821, an increase of £46,169 compared with the corresponding eight months of last year. The American figures available, covering only seven months (January-July), of this year, show an exportation to Australia of paper to the value of £112,429, or a decrease of £45,187 compared with the corresponding seven months of last year. Evidently the loss sustained by American exporters has been to the benefit of our paper shippers.

CHINA CLAY.

The German Papermakers' Association have discussed the moisture content of china clay without, however, coming to any definite decision on the matter. That from Bohemia contains, it is said, 3 to 6 per cent., while that imported from England 10 to 12 per cent., and even as much as 20 per cent. moisture. The question is much on a par with that of moisture in pulp. For any excess of moisture the papermaker pays for water instead of clay, and pays for the carriage of the water too.

In the "Papier Fabrikant," a writer, who claims to have had considerable experience with china clay (kaolin), recommends testing it both for sand and

micaceous particles. The former must be regarded as a useless make-weight, but it does not usually interfere with the paper as it is caught in the sandfang. With regard to the particles of mica, it is otherwise. Being in the form of thin plates, they are more readily carried away in a stream of water, and eventually arrive on the machine wire, and find their way into the paper, where for some varieties, such as chromo-paper, their presence is very harmful.

The method of testing the china clay is in principle the same as that in use for testing similar materials in the potteries. A known weight of china clay is brought into a vessel of water through which a carefully regulated stream of water passes. In this way the fine particles of true clay are carried away, leaving behind a deposit at the bottom of the vessel containing the sand and coarser particles. These are washed in another vessel, dried and weighed, from which the percentage of the useless coarser particles in the clay can be estimated.

KOLLERGANG VS. PULPING MACHINE.

A writer in the Wochenblatt fur Papierfabrikation enumerates the relative points of merit of the Kollergang, as compared with the pulping machine of the Wurster or Dietrich type.

Advantages of the Kollergang.—The Kollergang, in combination with a strainer, is almost indispensable for pulping up unsorted waste paper and trimmings containing string, binding thread, and other hard and elastic impurities. The stuff can be prepared either "free" or "wet," according to the density of the charge, moisture, and length of treatment; on this account a better felting and consequently a tougher paper and better retention of clay and fine fibres can be ensured. The Kollergang, moreover, is the only satisfactory means for pulping up hard papers, such as imitation parchment and strong glazed papers, since it has a kneading and rubbing action.

Disadvantages of the Kollergang.—The Kollergang necessitates a small and intermittent production; the period of treatment cannot be controlled; a certain amount of injury to the fibre cannot be avoided; the treatment is a lengthy one; the service is somewhat dangerous, and the upkeep is costly; any foreign bodies, such as wood or coal, are ground up with pulp, which also becomes contaminated with sand from the stones.

Advantages of the Pulping Machine.—For "machine-broke" and clean-sorted waste paper, and for all sorts of dry wood pulp, the pulping machine is vastly superior to the Kollergang. The work is continuous and the output is large; the operation is rapid and cheap; the machine having been adjusted, the condition of the prepared stuff is always constant; the fibre is improved; the service is perfectly safe; space is economized; foreign impurities are discharged intact.

Disadvantages of the Pulping Machine.—Unsorted waste papers may cause clogging and ultimately a breakdown of the machine; the treatment is not sufficiently drastic for certain kinds of hard paper; the machines cannot be used for the preparation of "wet" stuff.

PEAT IN PAPERMAKING.

Professor Frank, in Charlottenburg, recently delivered a lecture on peat as a source of fibre for spinning and papermaking purposes. In spite of the large number of patents that have been taken out with this object in view, he does not think that any results of practical importance have been achieved. A microscopic examination of those plants which form the greater part of peat bogs, shows that even when fresh they have very short fibres, which become weaker and less permanent when they have begun to decay. The difficulties in the way of using peat do not lie in manufacturing defects, but in the unsuitability of the raw material.

The only plant which, in his opinion, could yield a suitable fibre is the cotton-

grass (eriophorum vaginatum), which is sometimes found in peat bogs in considerable deposits attaining a depth of two or three feet, and decay has not proceeded far enough to weaken the fibre. Unfortunately, the fibres are set in a mass of vegetable matter, for the removal of which a whole series of chemical processes is necessary. In the end a product is obtained which looks very well in a specimen bottle, but on carefully counting the cost it soon becomes obvious that as a substitute for other fibrous material it is out of the question. It requires no proof, nor yet fresh patents, to demonstrate that peat fibre can be put into paper as well as mechanical wood pulp or china clay, but the peat fibre binds hardly better than these materials, and a serviceable paper does not result unless a proportion of rags or other material be added. In no case of itself can peat yield a strong and useful paper.

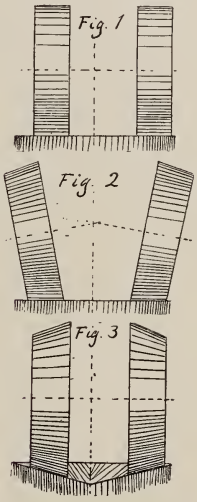
THE KOLLERGANG.

A. K. in Paper Trade Journal.

A rolling, kneading, and disfibering paper pulp machine, useful for many purposes, which has been operated in many European mills during more than forty years, has lately been introduced in a few of the progressive American mills, and is recognized to be a very useful and in many cases indispensable auxiliary in the performance of work, with a certain success that cannot be equalled by any of the beaters, refiners or disfiberers that have been introduced since the time of the disappearance of the old style stamping machines.

Let it be understood that nobody claims a total preference in favor of the mentioned irreplaceable constructions, but its useful and economical performance of a part of the pulp preparing process for special purposes is indisputable.

The modus operandi of the Kollergang has been considered as being too slow to suit our American spirit of progress, and even with many of the more or less initiated this idea is incorrectly prevailing. The error is explained by the superficial consideration of the construction of the Kollergang, as it appears that the level ground stone measures about 7¼ feet in diameter, being surrounded by an iron shell or rim; the vertically rolling and circulating stones measure about 6 feet in diameter by 20 inches in thickness; the circulations vary between only 9 to 12 per minute, and yet this bulky machine is capable of operating 400 pounds of dry stock



at a time and will disintegrate the same in an average time of from three-quarters to one hour. The space for holding the stuff appears too small by comparison with that required in the beaters, but in this respect the Kollergang offers the advantage that the stock requires to be saturated with a smaller proportion of water sufficient to bind the pulp in a thick, pasty shape, thus allowing the stones to traverse the mass or layers of pulp in order to exert their kneading and crushing effect by their own gravity; otherwise a well diluted mass of pulp would be in a state to flow away from under the rolling stones, thereby reducing the result considerably. The total daily (ten hours) output of the machine is variously claimed to reach between 4,000 and 6,000 pounds, but this result depends upon the quality of the stuff.

The Kollergang is in many cases used as an assistant companion of the beater. Frequently, however, the stuff is kneaded

into a fine pulp that is readily prepared to run on the machine unless the pulp is applied as an addition or perfecter to another class of stuff in the beater. The machine is also preferably used for the preparation of pulp for making cigarette, silk or tissue papers, and owing to its peculiar action of kneading and rubbing the machine is unequalled in the operation of turning hard parchment or hard sized and glazed waterproof old papers into their original form of slimy pulp. The objection to the otherwise required thoroughgoing boiling process of said stock is overcome by the fact that the Kollergang process requires no previous boiling of said hard stock.

A specialty wherein the Kollergang is also unequalled is the disfibering of old papers, to be made over into bleached similarities of their previous nature in sheets. Another advantage exists in the practicable disfibration of certain classes of old papers that require a too expensive sorting process, especially for the purpose of eliminating threads, cords or laces, etc. The Kollergang leaves these parts undestroyed, and they are readily separated on a shaking and sorting device. Common paper and board shreds are readily disintegrated into a good pulp suitable for binders, box or other boards. Another peculiarity exists in the mincing of wood chips, sorted pieces from the grinders, too large for the beaters, into a very strong class of pulp, used for making the new German and Swedish so-called "Kraftpapier" (power paper), that will be described hereafter. In large paper mills, especially those running several machines, the Kollergang is preferably used in a position underneath the machine floor for kneading the breaks or broken, whence the ground product is to be returned either to the beater or to the stuff chest. Thus it may be shown that although the mills generally have prospered without a Kollergang, yet those that know how to appreciate its useful and economical advantages have added to their success by engaging the services of this simple and old style machine.

One of the peculiar advantages of the kneader exists in the fact that the fibres are not ground into dead stock or dust during the kneading between stones. That the rubbing of the stone produces a better and richer class of fibres has been proven and requires no further argument; the millstone has already gained an appreciated position in the beater; its mild disfibering action, as compared with that derived from metallic appliances, is, or ought to be, understood. The kneader does not produce a short, hard cut fibre, but it separates and splits the fibres by kneading and pressing into a desirable consistency, and it has, above all, the capacity to produce a uniform composition of various grades from medium to fine into a slimy pulp, the latter being frequently very desirable for producing a hard and snappy sheet.

For many years a great number of well equipped European mills have used the Kollergang for complementing the product of the beaters and refiners in useful co-operation, each machine in its indispensable position. Regarding the prospects of the Kollergang in its onward march, it must be mentioned that for years it has been in growing competition with the wood pulp grinder. The first wood pulp paper was produced by Schafer 150 years ago, and he turned the wood sticks into pulp on a stamping mill of his own. The stamper, however, produces by far better pulp than the grinder, and had he ground his pulp the good old man might have been discouraged. Now the Kollergang produces a pulp about as good as the stamper; the difficulty so far exists in the yet unknown bleaching process of boiled wood pulp, and in this respect the Kollergang might be bettered so as to be fit to master unboiled chip subject to bleaching. However, it may be in place to describe the first known process to make unbleached wood pulp Kollergang Kraftpapier, derived from a description of the inventor, Professor E. Kirchner. Consul E. Rasch, director of the wood pulp mill Farssa, in Sweden, started the idea (in the 70's), to produce wood pulp by less power than that required in the grinding process. He desired to make wood pulp by rolling and squeezing on a kneader.

Prof. E. Kirchner, following Rasch's ideas, undertook to supply Rasch with the equipment for starting a plant, consisting of one chipper, two Kollergangs, one stuff pump and a centrifugal Hollander of Camus in Paris. Rasch constructed waterworks producing 40 horse-power in Farssa, in 1881, and succeeded with the mill plant in the production from steamed wood packed into chips of bean sizes, kneaded on the Kollergang, between hard quartz sandstones, in a slightly dampened state, by soaking and agitating the kneaded stuff in a tank, working the stuff into the beater, a nice cleanly ground stuff that proved of excellent quality for the production of hard brown pasteboard. Rasch, convinced of success (producing in 24 hours, with 40 to 45 horse-power, 3,000 pounds good board stock) and wishing to introduce the process into other mills, issued the following certificate: "Answering the demands of Prof. E. Kirchner, in Aschaffenburg, we certify that a mill of the system of Rasch-Kirchner has been operated in this place since the month of July, 1881, for the purpose of producing wood pulp by the so-called squeezing process. Our expectations have been fully realized, since the results, as compared with our older factory, offer the following advantages: The grinding and forming into boards of 100 kilogs. of stuff require 8 horse-power, whereas in the squeezing process only 3 horse-power is sufficient for the production of the same quantity and quality. The cost of the new mill, proportionate to its capacity, is one-half of that of our grinding mill; the working expenses are smaller, and less waste takes place in the squeezing than in the grinding process."

Based upon these results, Kirchner planned and built several mills that were, however, only in part successful, principally for lack of experience and enterprise. Kirchner sold his rights to the paper maker Henseling in Brunswick, who succeeded well in his two mills after perfecting the process. He started by stamping the wood chips, kneading them on the Kollergang, and by finishing in a stone refiner. The result afforded a soft stuff similar to rag stock. On account of his using iron vessels the pulp was of a darkened shade, and therefore unfit for fine papers.

Meantime, the Swedish work continued to run successfully, following the Rasch-Kirchner process; the output proved a fivefold increase in 1897 during the last ten years. One chipper, three Kollergangs and three beaters are still in operation; plain wood pulp requires 6.25 horse-power per 100 kilogs. The principal product is a very salable binders' board. These various processes have been materially improved, although reliable particulars are not readily obtainable. Yet it is constantly stated and shown that a very strong and useful wrapping paper is produced in various German and Swedish mills and that their output finds a ready market, especially in England. The accompanying sketches illustrate the position of the runners. The machine is usually provided with scraping devices, although in new constructions it is claimed that the scraper is not required; yet it seems that in their adjustment the same may be made to operate in the manner of a plowshare by turning the stuff over the mold board, whereby the preference should be maintained in favor of the scraper. Also the rubbing of the rounded corner of the runner against the lower part of the shell appears to be like a crushing and grinding to powder process. The position of the stones, as shown in Fig. 1, is considered to be the most rational, and the same is preferably adopted. The position of the stones, as in Fig. 2, causes increased friction in the stone coupling device and requires additional power; the increased grinding surface could be well replaced by increased width of stone. No. 3 likewise requires more power than No. 1 on account of the concave bottom stone, which disadvantage is said to be well compensated by the better kneading and rubbing process. Ways for improvements in this line may be difficult to discover; the whole arrangement has for a long time been applied to a multitude of other purposes. However, it is not unlikely that we may learn in the near future from some part or other in this country that the spirit

of progress has taken this old matter in hand, and the next step may be in the welcome production of an improved construction for doubling or trebling the output in order to answer to the restless trend of our times.

THE BLEACHING OF WOOD PULP.

By R. W. Sindall, F.C.S., and F. Heckford, in World's Paper Trade Review.

(Continued from last issue.)

In dealing with apparent discrepancies, which occur when the consumption of bleach shown by a chemical pulp in the laboratory differs from that which obtains in the mill, we must endeavor to trace the causes of the differences rather than merely condemn the laboratory figures. This point we have already dealt with, and we may now proceed to go further into detail by means of some definite experimental evidence.

Table III.

Showing percentage of bleaching powder used on different pulps, in the laboratory and in the mill:

Brand of Pulp.	Percentage of Bleach Used. Laboratory.	Mill.	Difference.
1	4.2	8.0	3.8
2	9.3	13.5	4.2
3	5.6	8.8	3.2
4	14.6	16.6	2.0
5	5.0	8.0	3.0
6	10.6	13.8	3.2
7	7.2	10.8	3.6
8	6.5	11.7	5.2
9	12.3	16.5	4.2
10	7.3	11.7	4.4

In Table III. we give the results of some laboratory trials on a certain number of sulphite pulps, and the figures obtained in the mill. The consumption of bleached is expressed in terms of the percentage of good average bleaching powder used for a normal color in each case. According to this table, the pulps appear to require on an average about 3.75 per cent. more bleaching powder when treated in the mill. A close examination of the conditions under which the bleaching operations were conducted has proved that this difference may be reduced to about 1 per cent. In the laboratory trials the proportion of wood pulp to solution was wood pulp, 10 lbs., solution, 90 lbs.; the solution containing 22 lbs. of powder per 100 gallons, while in the mill the proportion was wood pulp, 6 lbs.; solution, 94 lbs. We have found that by using more water per pound of pulp in the laboratory on the one hand, or by using less water in the mill on the other, that a much closer agreement is possible. This question of the proportion of water in relation to the bleach consumption is in reality an important one. The influence of the quantity of water used per cwt. of pulp in the beater is not so fully appreciated by papermakers as it should be, and a few definite trials under carefully regulated conditions would soon convince them that the operation of bleaching wood pulp is not such a simple matter of routine after all. "More water, more bleach," is a common expression, and a common experience, but it is a fact which has not been properly studied. We are too ready to accept the idea that the extra bleach is simply consumed by the extra water itself. But the amount used is always considerably in excess of that actually required to neutralize the water, and we are forced to seek some better explanation. Probably the active bleach in solution attacks the chlorinated organic compounds, formed during the process, and the actual bleaching of the pulp is retarded, so that not only is the consumption of bleach greater, but the period of time occupied is longer.

This process of the dissociation of unstable soluble compounds takes place more readily in dilute solutions and aids the lowering of color, which is often observed in pulps which are "over bleached," as it is called. The recognition of these facts finds practical expression in the operation of what we may call "successive bleaching." A pulp may be bleached to a much better color by draining off the partially spent bleach liquor after a given period, and then following this with the addi-

tion of a further one or two per cent. of fresh liquor. This plan will often remove the yellow tinge found in half-stuff from poor qualities of pulp, and reduce the percentage of heavy matter.

The possibility of making such a process pay on a large scale is determined by the system of bleaching used in the mill, and the plant which may be available. In most cases, where the output of bleached half-stuff from the engines has been increased merely by the addition of an excess of bleach liquor, or by the liberal use of steam, any alteration in the method of treatment is not readily accomplished, and it is then a question of determining what additional plant would effect the purpose.

The process of bleaching would be greatly improved by the adoption of any system by means of which the by-products of the operation could be removed from the sphere of action. The ideal method would be one in which the resultant soluble compounds could be got rid of as fast as they were formed. Naturally such removal by any simple process is out of the question, and the nearest approach to it is the use of "small successive bleachings." In actual working even this idea has to be applied within very definite limits. We may note the fact that the gradual abandoning of the old method of using spent bleach liquors from bleach half-stuff for breaking down fresh powder is an illustration of the importance of these matters, though probably the explanation would not readily suggest itself to papermakers, except to those who had studied the matter carefully.

(To be continued.)

EARLY PAPER-MAKING IN ENGLAND.

At the Southampton Loan Exhibition of relics of old Southampton, last month, William W. Portal delivered a lecture in which he spoke of the art of paper-making, as associated with the refugees at Southampton, and from which we extract the following:

Many industries received fresh strength and developments from the energy and enterprise of the refugees who made their home in England, and those industries were often especially associated with the various localities in which the "strangers" were established. Among the trades adopted by the foreign settlers at Southampton, prominence may be given to the art of paper-making.

In the manufacture of paper this country had, until late in the 17th century, been eclipsed by her Continental rivals; all the best papers were imported, and chiefly from Holland, France, and Italy.

Nor was it an easy matter for our countrymen to acquire a knowledge of this art from abroad. Ulman Stromer, the author of the first work dealing with paper-making, established a paper mill at Nuremburg, in 1390. He compelled his employees to bind themselves by an oath that they would neither make paper on their own account nor communicate the art to any other person, and in the 16th century we find the Dutch so apprehensive lest their pre-eminence in this industry should be placed in jeopardy, that the exportation of paper moulds was made punishable by death.

A protective conservatism, differing in degree, existed also in France and Italy. Under these circumstances, it is not surprising that paper-making in England did not derive advantage from the more inventive genius of Continental nations.

Fuller, writing in 1661, speaks in the following quaint terms of the paper of that time: "There are almost as many several kinds of paper as conditions of persons betwixt the Emperor and beggar; imperial, royal, cardinal, and so downwards to that coarse paper called 'emporetica,' useful only for chapmen to wrap their wares therein." He adds: "Paper participates in some sort of the country which makes it, the Venetian being neat, subtile, and court-like; the French light, slight, and slender; and the Dutch thick, corpulent, and gross."

In Fortrey's "Account of Trade Between Great Britain, France, Spain, Etc.," (1663),

we learn that paper of the value of £100,000 (no small sum in those days), was then imported from Auvergne, Poitou, Limousin, Champagne, and Normandy.

The Revocation of the Edict of Nantes in 1685 would seem to have had an immediate effect upon the development of the paper industry in England.

"The first manufactories of fine, white paper," says Mr. Weiss, "were founded in London in 1685 and 1686 by French workmen from Casteljaloux, Thiers, Ambert, and especially from Angoulême."

"The English," says another writer, in 1703, "have now so great an esteem for the workmanship of the French refugees that hardly anything vends without a Gallic name."

About four miles from the mouth of the River Itchen, and three to the north of Southampton, is still existing a corn mill, formerly known as "Upmill," or the "Paper Mill." At the commencement of the 18th century, and probably at an earlier date paper was here manufactured and many names of Huguenot refugees, at Southampton, occur as connected with it.

A noteworthy event in the history of paper-making in this country was the grant of a charter by James II., in 1686, the year following the Revocation of the Edict of Nantes, to "The Governor and Company of the White Paper-makers of England."

At the date of the passing of the Act for its formation, the company had but five mills at work, as compared with about 100 mills employed by other paper-makers in England. The locality of these five mills has not been definitely ascertained, but it is probable that one of them was that at South Stoneham.

The members of the "Company of the White Paper-makers" were 15 in number, of whom nine were refugees, or members of refugee families, and three of these were actually resident in Southampton or its neighborhood. Their names were Adam de Cardonnel, Elias de Grouchy, and Claude Bordier.

The name of one other refugee may be mentioned, who in or about the year 1705 was associated with the paper mill at South Stoneham, under remarkable circumstances, and who continued there for eight or nine years. This was Henri Portal, who became the founder of a still existing Hampshire family. His remarkable escape from France after the Revocation of the Edict of Nantes is graphically described in Agnew's "French Protestant Exiles," and Smiles' "Huguenots." He reached Southampton at the age of 14 or 15, and betook himself to Stoneham, where many of his fellow-countrymen were engaged, and where he obtained a full knowledge of paper-making. He was naturalized in 1711, later obtained a lease of Bare Mill, near Whitchurch, in the north of Hampshire, and in 1718, of Laverstoke Mill, in the immediate neighborhood. He carried on the business of paper-making at both of these mills, and was joined by John de Vaux, and others from South Stoneham. His energy and enterprise were attended with success, and in 1724 he obtained that privilege of manufacturing the Notes of the Bank of England, which is still continued at Laverstoke Mills by his lineal descendants of the fourth generation.

It is a descendant of this refugee who delivered the lecture from which the above information is culled.

BRITISH PAPER TRADE AND THE FISCAL POLICY.

Our worthy contemporary, Paper and Pulp, in an article entitled: "Chamberlainism and 'The Doctor,'" waxes eloquent in an appeal to paper-makers not to be "dragged under the chariot wheels of an adventurous politician." "We have no doubt at all," says that journal, "that in a few months the utter defeat of the new 'Protection' will be assured, but we would like that our manufacturers—especially our paper manufacturers—were thoroughly satisfied that its defeat means their salvation." Very good indeed; but can our contemporary satisfy them on that head when papermakers have such stubborn facts to face as the following:

£1,695,006 of "unprinted" paper—"not on

reels"—was imported into the United Kingdom during the past eight months, January to August, 42 per cent. of which came from Germany, Holland and Belgium, 39 per cent. from Norway and Sweden, 6 per cent. from the United States.

That, by the way, is only part of the paper imported into this country, and is not inclusive of "news" and "printings on reels," nor of various other kinds of paper and boards. The writer of the article quite ignores the position of the paper-making industry of the United Kingdom when he points to our import trade in 1880-1884, as being £408,000,000 per annum—in 1895-1899 it was £453,000,000 per annum, our exports having risen in the same period from £234,000,000 to £239,000,000—and then refers to the tonnage of our shipping as being some 8,000,000 more than all the rest of the world. We maintain that our home paper-making trade has not increased in anything like the proportion it should have done to the consumption.

"We have still more than half of the carrying trade of the world, and our free imports give us the largest export and re-export trade in the world." Here, again, does that help our paper-makers? We fail to see it. If we are simply to become common carriers for the whole world, our contemporary's argument is good; but as an argument against protecting our home industry it is useless. We notice the words "have still" are used in the above quotation, and it is well the writer put it in that way, for it is patent to everyone we shall not long continue to have the giant share even in shipping.—Paper-Making.

TESTING PAPERS FOR GROUND WOOD.

1. Strong nitric acid stains ground wood papers brown.

2. A saturated solution of aniline sulphate in alcohol stains ground wood papers yellow.

3. The best reagent for the purpose is phloroglucin solution: 1 gram phloroglucin, 50 c.c. alcohol, 25 c.c. concentrated hydrochloric acid.

This stains ground wood papers a brilliant red. Since the above reagents develop their characteristic colors with any lignified fibre, the only final and conclusive evidence of the presence of ground wood is that furnished by the microscope. "Useful Data for Paper Makers," by Little & Walker, Boston.

DIETRICH'S KNEADER.

Exhibits of paper making machinery at the St. Louis Exposition are not so numerous as to diminish the attention paid to them as individual displays. One of the most important contributions to the illustration of the development of the industry is the exhibit of Robert Dietrich, of Merseberg, Germany. Mr. Dietrich is a manufacturer of paper and pulp, on a large scale, with mills at Merseberg, and he is also the inventor and builder of many machines and appliances for use in paper making, the need of which he has discovered in the course of his experience as a paper manufacturer. Mr. Dietrich has had great success in introducing his device in Continental mills. He has exhibited a number of them at St. Louis, and the most important of them is doubtless the kneader for pulping paper stock.

The kneader to a large degree displacing the Kollergang in Continental mills, inasmuch as it does more work and better work in less time and with less power. In discussing the comparative merits of kollergang and kneader, a technical writer in the Wochenblatt fur Papierfabrikation speaks, as follows, of the advantages of the kneader, having previously referred to the Dietrich kneader as one of great efficiency and usefulness:

"Continuous Operation.—The continuity of the kneader's operation entitles it to preference.

"Rapid disposal of the 'breaks' or 'broken' of a large machine, and speedy treatment of dry wood and other fibres. —Formerly a large Kollergang had to

struggle day and night in order to overcome the waste sheets of a few paper machines. At present one modern kneader is able to treat the same amount of broken during half the time.

"An exactly limited time of Operation.—The stock fed into the kneader through a hopper undergoes a change within a few moments into a stuff that is readily prepared for the beater or stuff chest. The material may be directly worked up, or stored for future use.

"Economy in Time and Money.—By comparing the capacity of the Kollergang with that of the kneader, the preference must be awarded to the latter.

"The Facility of Producing a Uniform Quality of Pulp.—The uniformity of the working of the machine must naturally produce an even quality of stuff; a subject of great consequence regarding the uninterrupted effort at the obtainment of increasing speed.

"Saving of Fibre.—The kneading and rubbing process is effected by a kind of hydraulic pressure, respectively, by suction among the fibre bundles. Injury to the fibre is thus prevented, because the fibres are not submitted to any change of their original character.

"Prevention of Accidents.—Although we possess no statistics regarding any accidents during the short period of operation, we would state that any danger point in the kneader is hard to discover in any part of its substantial construction.

"Saving of Room Regarding the Waste Paper from the Machines.—A special advantage is gained by carrying the 'broken' directly into the machine, whence the product may be directly conducted into the stuff boxes or into the beaters.

"Foreign matter remains intact or unbroken, without imparting injury to the stuff. Undesirable substances, like pieces of coal or wood, are separated in the apparatus in a very reliable manner."

Among the advantages claimed by Mr. Dietrich for his kneader are the following:

Simplicity of operation; greatest economy in power at the low speed of 90 to 100 revolutions per minute; substantial construction; stronger than all known kneaders. Only one shaft; no spur gearing required; choking-up by iron and string avoided. Fitted with a stone, sand and iron trap underneath the patent kneading worm that draws in the paper, thus obviating damage to the kneading mechanism. Fitted with string, rope and rag traps, easily cleaned while the machine is running; even without these traps, portions of string, rope and rags adhere to the kneading worm, from which they may easily be removed by merely shifting the belt to the loose pulley. Manufacturers of wrapping paper are enabled to use unsorted waste paper or "broken;" other kneaders would be choked by string and rope. Wrapping paper from waste paper, "broken" straw paper, and cardboard can be made without the use of a beater. Very large feed and delivery openings give almost unrestricted capacity for "broken" paper on account of the large arms and wings of the kneading worm. The kneading wings are serrated on all their edges and work against toothed steel knife plates; hence, the ready tearing of "broken" paper and even cardboard and paper tubes may be worked up by the machine.—Paper Mill.

MORDANTS AND DYES FOR PAPER.

Julius Hubner, of the dyeing, printing and paper-making department of the School of Technology, Manchester, England, has the following, in regard to paper coloring:

Paper fibres, being nearly exclusively of vegetable origin, show much less affinity toward coloring matters than do the animal fibres, wool and silk. On account of the minute state of division of the fibres in the pulp, colors are, however, generally speaking, much more readily taken up than is the case in the dyeing of the same fibre in the form of yarn or cloth.

The affinity of the various fibres toward coloring matters differs considerably, a factor to be taken into consideration in the manufacture of colored papers which consist of a mixture of various kinds of fibres. To secure a level appearance of

the surface of papers of this description, mineral loading materials or mechanical wood pulp are added, the contrast of shade being thus considerably reduced. The coloring matters used in the dyeing of paper pulp may be conveniently divided into two groups, namely, the substantive and the adjective colors. The former dye fibres direct, that is without the application of a mordant, whilst, when the latter are used a previous mordanting of the fibres is necessary to ensure fixation.

In the manufacture of cheap colored papers, the rosin size added to the pulp may be considered as the natural mordant for many colors. The finely divided rosin, which surrounds the fibres, acts in these instances as a fixing agent.

The mordants most commonly used in paper dyeing are alum and aluminum sulphate. Their application is very simple, and they possess a remarkable affinity toward many coloring matters. Iron salts, such as ferrous sulphate, nitrate of iron and acetate of iron, are used in the dyeing of greys, blacks and other dark shades and in the manufacture of Prussian blue, a color very much in demand for paper dyeing.

Tannic acid is a very valuable mordant; with iron mordants it produces useful greys, which may be conveniently used as a bottom for other colors. Tannic acid, employed either by itself or neutralized, or precipitated with tartar emetic, is the best fixing agent for the basic aniline colors, such as magenta, methylene blue, etc.

The principal coloring matters, which are used in the dyeing of paper pulp, may now be briefly reviewed, classifying them for this purpose into "inorganic" and "organic" colors. Of the former class, the natural mineral colors, also called earth colors, are still very extensively used on account of their cheapness and their property of acting both as coloring and loading materials. The various brands of iron ochre, the oxide red, caput mortuum, umber, sepia, green earth, mineral black, China clay, and pearl hardening, are amongst the principal representatives of this class.

The artificial mineral colors may either be prepared outside the beater and then added to the pulp, or the precipitation of some of these colors may be actually effected in the beater. Wherever convenient, preference should be given to the latter method, the precipitation of the color as well as the fixing being partly accomplished in the fibres.

BRITISH PAPER IMPORTS.

The paper trade in Britain is rather dull at present, with the exception of the news trade, where the demand is steady. The war in the East has not boomed this demand to any great extent, however, as the lack of definite information has called for few special editions. Prices generally are low, though company reports show good dividends on the whole. Protectionists point to foreign competition as the cause of the prevailing low prices, while free traders are extremely doubtful of any lasting benefit to British trade to be derived from a protective tariff.

The annual consumption of news in the kingdom is over 400,000 tons, and of this British paper makers supply only one-half. Unexpected as it may be, Holland is the largest exporter of paper to Britain. Of course paper shipped from Holland may not all have been made in that country, but may have been shipped from other European countries, through Dutch ports. The official returns show the following values of the principal paper and board importations into the United Kingdom for the years 1899 and 1903:

	1899.	1903.
Holland	£915,191	£1,257,859
Sweden	498,479	898,535
Norway	569,168	578,957
Belgium	367,089	566,545
Germany	478,329	560,648
United States ...	405,905	359,897

It is seen from these figures that last year 25 per cent. of the total imports came from Holland.

In the various classes of paper, of course the countries stand in various relations. In unprinted paper the order of countries in value of their exports, both in 1899 and 1903, was: Sweden, Norway, Holland, Germany, Belgium, and United States. Last year Sweden was away ahead, the value of her exports being over £830,000, as against £556,000 from Norway, the next competitor. The receipts of unprinted paper are now classified "on reels" and "not on reels;" in the former class the United States stands third on the list, while in the latter class it is sixth.

In printed and coated paper, Belgium has a practical monopoly, showing £287,000, as against the £91,000 of Holland, the second on the list. The United States comes in fourth with £35,000.

It is in strawboards and millboards that Holland gets her lead. Out of £775,000 worth of these goods received in 1903, £633,000 worth, or over 80 per cent., came from Holland. This leaves Germany, United States, Sweden, Belgium and Norway to come along with their small contributions of from £48,000 down to £1,000.

In wood pulp boards, Russia leads with £107,000, Sweden, United States, Norway, Germany and Holland following in that order.

It will be seen from these figures that the flooding of the British market is not caused by "dumping" by American manufacturers, as has been often charged.

THE INFLUENCE OF ANIMAL SIZE UPON THE PHYSICAL PROPERTIES OF PAPER.

It has long been a well-known fact that animal size influences both the strength and elasticity of paper, and a more accurate knowledge of the influences exerted by this substance may, perhaps, be of interest to many. By animal size I do not mean the mere application of a thick layer of size, forming a brittle, transparent mass all over the paper, but rather the least possible quantity that will properly size the paper and provide an agreeable surface to write upon. In fact, the real art of sizing paper consists in allowing it to take up as little size as possible, as an excess of size always detracts from the pure white of the paper, the discoloration increasing in proportion to the amount of size applied. To attain the best possible results, the sizing bath should be as dilute as possible, the temperature carefully watched, and the web of paper allowed to remain in the bath long enough to enable it to become completely saturated with the dilute solution. After being sized and dried, the surface of the paper should be quite smooth; any shiny places indicate an excess of size, or that the size bath has been too concentrated. In the experiments recorded below, a pure linen writing paper of exceptional strength and sized with rosin size was used, and the chief question to be answered was whether the sizing per se influenced the strength and elongation of the paper, or whether it was only the wetting and subsequent air drying. The paper was already fairly well sized, and could consequently not take up any more, the sizing bath was therefore quite dilute, but after sizing the surface was perfectly smooth and showed no excess. Several sheets were also soaked in pure water and dried in air like the others. Finally all the sheets were slightly calendered and kept in the laboratory for a considerable time so as to be tested under perfectly similar conditions. Three samples of paper were examined and were as follows:

I. Single rosin-sized paper.

II. The same paper wetted and air-dried.

III. Paper sized with rosin and animal size.

Two sheets of each kind were examined, all the sheets being of faultless look through and uniform surface. Paper I. was examined first. Both sheets gave the breaking lengths and elongations stated below:

Paper I.

Average breaking length.

	Machine direction.	Cross.
Sheet 1	8,480 m.	6,220 m.
Sheet 2	8,000 m.	6,500 m.

Average elongation.

	Machine direction.	Cross.
Sheet 1	5.1 p.c.	7.2 p.c.
Sheet 2	5.2 p.c.	6.0 p.c.
Mean breaking length	7,300 m.	
Mean elongation	5.88 p.c.	

Paper II., saturated with water and air-dried, was next examined.

Paper II.

Average breaking length.

	Machine direction.	Cross.
Sheet 1	8,136 m.	6,264 m.
Sheet 2	7,340 m.	6,920 m.

Average elongation.

	Machine direction.	Cross.
Sheet 1	6.0 p.c.	7.0 p.c.
Sheet 2	5.2 p.c.	8.0 p.c.
Mean breaking length	7,165 m.	
Mean elongation	6.55 p.c.	

Lastly, Paper III. (double sized) was examined.

Paper III.

Average breaking length.

	Machine direction.	Cross.
Sheet 1	8,520 m.	6,940 m.
Sheet 2	8,210 m.	7,390 m.

Average elongation.

	Machine direction.	Cross.
Sheet 1	6.3 p.c.	9.0 p.c.
Sheet 2	6.3 p.c.	7.7 p.c.
Mean breaking length	7,760 m.	
Mean elongation	7.33 p.c.	

Looking, first of all, at the three breaking lengths, I., 7,300 m.; II., 7,165 m.; III., 7,760 m., it will at once be seen that the animal size has influenced them considerably, whereas the wetting has lowered the breaking length somewhat, a matter of lesser import, as similar slight variations also frequently happen. The results of the elongation tests, however, show a marked rise: I., 5.88 p.c.; II., 6.55 p.c.; III., 7.33 p.c; this testifies to the favorable influence of the moistening, but the second sizing also shows a marked improvement.

The fact that merely air-drying paper improves its physical properties is well known, and has given rise to the practice of air reeling on high-class paper machines. Good animal sizing is, however, always valuable, as it not only increases the tensile strength of the paper, but renders it much more pleasant to write upon. The resistence to crumpling I cannot give accurately, as this was extraordinarily high in all three cases, and as I had no mechanical crumpler at my disposal, I am unable to give any figures on this head. I also carried out some experiments with totally unsized paper of pure linen, which I sized with a solution of animal size, using the very least possible quantity. I also determined the increase in weight due to the sizing. Both the sized and unsized sheets were kept in the laboratory for a considerable time before being submitted to examination.

A—Unsized Paper.

(Weight per square metre, 55 g.)

Mean breaking length ..... 6,300 m.
Mean elongation ..... 5.4 p.c.

B—Paper Sized with Animal Size.

(Weight per square metre, 60 g.)

Mean breaking length ..... 7,260 m.
Mean elongation ..... 7.4 p.c.

Increase on breaking length 960 m.=15 p.c.
Increase on elongation ... 2 m.=37 p.c.
Increase on weight per sq. metre ..... 5 g=9.04 p.c.

It may be assumed, therefore, from the foregoing, that a good sizing with animal size, which, as above explained, must not be too strong, materially improves a paper. —E. L. Selleger, in Der Papierfabrikant.

THE BRIGGS ELECTROLYTIC CELL.

Our attention has been called to an improved method of making bleach liquor by the electrolytic process, invented by F. J. Briggs, of Malden, Mass., and for which letters patent have been granted both by the Dominion of Canada and the United States.

The invention is designed to overcome all of the defects of diaphram cells heretofore built and which have prevented their general introduction by the mills consuming chloride of lime in more or

less quantities. A demonstration plant which has been in operation for several years, proves that the Briggs' system may be installed with profitable results.

Long and severe tests have been made by the leading experts of the country to prove the following claims, viz.: High current efficiency, high energy efficiency, satisfactory strength of caustic, exceptionable durability of all parts. These claims have all been substantiated, and the experts were also impressed with the cell's simplicity in construction.

It is, however, the commercial side of the process that will interest manufacturers particularly. Each cell is capable of producing the equivalent of 35 tons of chloride of lime annually with a by-product of caustic soda. With horse-power on a reasonable low basis, bleach may be manufactured for $10 a ton.

LITERARY NOTES.

The growth of the English language is remarkable. Between the 1890 edition of Webster's International Dictionary and the issue of 1900, no less than 25,000 words were added to that work. Now a new edition of this standard lexicon has been issued, and this revision shows an increase of 25,000 more words in the four years. These additions to the language are no doubt chiefly due to the rapid development of practical science. For example, the 1847 edition of Webster contained 44 entries between the words "electric" and "electrum," in the 1864 edition these entries were increased to 81, in 1890 to 145, and in 1900 to 181. The new edition of Webster's International not only contains 25,000 new words and terms, but the biographical dictionary and gazetteer of the world has also been revised and brought down to date under the supervision of Dr. W. T. Harris. Among other features there are new colored plates, a list of authors quoted, a brief history of the English language, guide to pronunciation, principles of orthography, etc. It is remarkable for compactness and comprehensiveness, and it will be found to contain many definitions which will be looked for in vain in some so-called cyclopedic dictionaries. G. and C. Merriam, publishers, Springfield, Mass.

Lockwood's Directory of the Paper and Stationery Trades, 1905, is issued, and this the 30th annual edition, makes a volume of 698 pages, exclusive of the advertisement section. It contains lists of the paper, pulp and fibre mills of the United States, Canada, Mexico, South America, and Japan, with lists of the paper and paper stock dealers of the United States and Canada. Besides these, it gives a directory of the wholesale and retail stationers, booksellers, wall paper manufacturers, blank book, paper bag, paper box, and other manufacturers of articles made from paper. The capacity and products of the mills are given, with the kind of power used, and where possible the officers and directors of the companies. One section is devoted to the water marks and brands used by paper manufacturers, another contains the names of the railway purchasing agents of the United States and Canada. The work also contains some useful statistics and tables with a list of the officers of the different associations connected with the paper and allied trades. The information appears to be very complete. Published by the Lockwood Trade Journal Co., 150 Nassau St., New York; price, $3.

The Educational Outlook of Prince Edward Island has been combined with the Prince Edward Island Magazine, and the July and August numbers, issued together, make a very interesting budget of historical and general matter. The frontispiece is a striking view of Pollydale, where the ship Polly landed many of the Selkirk settlers of 1803. The magazine is published by Archibald Irwin, Charlottetown, P.E.I.

In the fire in Winnipeg, a few days ago, Bullman Bros., lithographers, were burnt out, the machinery, as well as stock, being a total loss. The loss was reported to be about $150,000, with insurance of about $40,000. The firm will rebuild.

Mill Matters.

The Pejepscot Paper Co., of Topsham, Maine, has been licensed to do business in New Brunswick for one year, beginning September 1st.

The Granite Wall Paper Co., a United States concern, will erect a factory in Hull, Que., employing from ten to twenty hands for the first year. The city council has granted the company exemption from taxes for five years.

A Quebec charter has been granted to the Chatham Pulp and Paper Company; capital, $200,000; headquarters at Lachute Mills, to manufacture pulp and paper and carry on a general lumbering business. The charter members are: Thomas Henry Ayers, John Thomas Ayers, William Henry Ayers, Ernest Francis Ayers, and James Thomas Griffith, all manufacturers, of Lachute Mills.

The city of St. John has purchased the mill of the St. John Sulphite Pulp Co, at Mispec, their tender being $115,000. The city thus obtains water rights necessary in the proposed extension of the city water supply, and may utilize the property in the future in a scheme for municipal lighting. It is reported that the property with the exception of certain water rights, may be disposed of by the city.

The Quatsino Pulp and Power Co. have surveyed 50,000 acres of their extensive limits and so far the cruise is fully up to expectations, the field notes showing an average of 50,000 feet to the acre in first-class timber, which consists chiefly of spruce, balsam and fir. Specifications and plans are now being prepared for the erection of the plant, preparatory to calling for tenders for its erection. The plant and mill is to be capable of manufacturing 125 tons of pulp a day. This will, no doubt, give a strong impetus to the northern part of the Island, and the pay roll, when work is under way, will be a heavy one. Mr. Colby, hydraulic engineer, has completed his plans for the development of the water power. It is the intention of the company, wherever possible, to place its orders for machinery in Canada.—B.C. Lumberman.

The Spanish River Pulp and Paper Co. are making satisfactory progress in the construction of their power dam. When the work was in the contractor's hands great trouble was experienced with leaks in the coffer dam. The company (which has now taken over the work from the contractor), is using the old coffer dam merely for a backing for a new line of piling and filling, and the bad places are now being successfully overcome.

Two actions of the Bank of New Brunswick v. Montrose Paper Co. were before the Court of Appeal in Toronto on the 5th inst. The defendants appealed from the judgment of the Judge of the County Court of Lincoln, on motion for summary judgment under rule 603 in plaintiff's favor for the amount sued for. The actions were on two promissory notes which the St. John Sulphite Co. (in liquidation) had discounted at the plaintiff's branch in St. John. The defendants contended that the notes were renewals of prior notes; that the plaintiffs were not justified in refusing to pay a cheque sent by the St. John Sulphite Co., to return the prior notes; that the plaintiffs had notice of the nature of the whole transaction, and that the amount realized from discounting the notes was to meet the cheque when returned. The plaintiffs denied notice, and contended that the notes were discounted in the ordinary course of business, and they were within their rights in applying the amount to the credit of the company on a demand note held by them, payment of which had been demanded. The case is not finished.

The Imperial Paper Mills, of Sturgeon Falls, have been running full capacity, though under somewhat enhanced running expenses since their recent fire. The output is 48 tons per day on an average. About 130 men are employed in the mills, and 300 in the camps. During the last week of September, orders to the extent of 4,000 tons of paper had to be refused by the company. The barker room, which was burned, is about to be rebuilt. A temporary room was equipped immediately after the fire with barkers from the Spanish River mill (which is idle pending

power development), and operations were resumed in eighteen hours, the men meantime peeling pulpwood with draw-knives. John Craig, the general manager, is now in England conferring with the directors as to enlarging the mills. A sulphite mill will probably be added to the plant, and later it is the intention to enlarge the ground wood mill. Arrangements are about completed by which Mr. Craig will take up his permanent residence in this country. The town of Sturgeon Falls is showing signs of prosperity. There is considerable building going on; the C.P.R. station is already too small for the town; and the mouth of the river is about to be improved, the Dominion Government having promised a dredge for that purpose in the spring. With regard to the differences between the Imperial Paper Mills and the Ontario Government, Hon. F. R. Latchford, Commissioner of Public Works, states that he has instructed the Government Engineer, Mr. Fairbairn, to make a survey of the outlets of the lake, with a view to discovering exactly how far the demands of the company may be acceded to without injury to the lake.

Forestry and Pulpwood

Dr. J. M. Bell, who has been exploring for the Ontario Government the iron ore ranges of the Michipicoten, reports the discovery of new ranges containing much iron ore and other minerals, mainly magnetite. The timber in the district is of great value, consisting of spruce, maple, birch, poplar, and pine. There is a considerable quantity of agricultural land on the Pacaswa river.

An electrical paper states that wireless telegraphy is to be employed to aid in saving the forests of the west. The United States Bureau of Forestry will establish wireless stations at intervals throughout the Rocky Mountains, where there are large forests, and where fires occur in the dry season every year. At these stations observers will be kept who will give warning whenever a fire begins, and help will be called to assist in extinguishing it. The first system to be set in operation will be in the Black Hills.

Thomas Southworth, director of colonization for Ontario, has returned to Toronto from a three-weeks' tour of the Temagami forest reserve. He was accompanied by Dr. Clark, the provincial forester, and four rangers, who went over the whole reserve. Everything was found satisfactory and the rangers reported that they only had three fires to put out in the last three months. None of these had assumed very serious proportions and for every one of them survey parties were responsible.

Alex. McMillan, of the School of Practical Science, who was sent out by the Crown Lands Department to explore a district between Mattagami River and Lake Abitibi, has returned. He reports a somewhat flat, but well drained clay country. Good spruce grows along the streams up to 30 inches, and inland there are great quantities of pulpwood. There is plenty of poplar too, and birch. Streams are reported very numerous, and suitable for getting out lumber.

The water in the Ottawa river is this year lower than it ever has been within the memory of the "oldest resident." Timber, which used to float to Quebec, now has to be put aboard train at Pembroke. It has been proposed by a veteran lumberman of Ottawa to dam the northern outlet of a lake at the height of land, diverting its waters to the Ottawa. It is also proposed to build retaining dams at Moffat's Canal and Fitzroy Harbor, lower down the river.

PERSONAL.

Sir George Newnes, of London, Eng., proprietor of Tit-Bits, the Strand, Review of Reviews, and other publications, is on a pleasure trip through Canada this month, accompanied by his son, F. H. Newnes, who is Liberal candidate in a Nottinghamshire riding in the next elections.

J. M. Mackinnon is now in England in connection with the business of the Oriental Power and Pulp Co., of British Columbia.

Among the recent arrivals from the Northern Coast was Manager Williams, of the Bella Coola Pulp Mill Company. He proceeded to Seattle. The company has been conducting a number of surveys of their timber limits in the north, but have now suspended work until early spring.—B.C. Lumberman.

In the Superior Court of Montreal the International Flax Fibre Company, of New York, has brought action against J. R. Lerendeau for $450,000. Mr. Lerendeau was made a director and vice-president of the company last March, and it is stated that the president, G. R. De Montlord, handed the amount named, in stock certificates, to the defendant, in payment of a debt to the company. The defendant refused to hand the certificates over to the company, hence the action.

CATALOGUES, SAMPLES, ETC.

The following are among catalogues, samples, booklets, etc., received at the office of the Pulp and Paper Magazine:—

Montrose Paper Co., Thorold, Ont., book of samples of bond, linen laid, envelope, book and litho. papers.

The Babcock Printing Press Mfg. Co., of New York, and New London, Conn., booklet descriptive of a new type of "Optimus" press.

The Geo. F. Kenny Paper Co., Detroit, Mich., samples of coated papers.

The Buyers' Reference Co., 123 Liberty St., New York, the "Steam edition" of this company's publications, containing the names of leading U.S. dealers in and makers of steam plants and supplies.

Illinois Iron & Bolt Co., Carpentersville, Ill., booklet of the Southworth pattern hydrostatic paper testing machine.

PULP DRYING APPARATUS.

Editor Pulp and Paper Magazine,—

Sir,—In the Pulp and Paper Magazine, I see the article on Wood Pulp, by S. Gagne, B.A. Mr. Gagne refers to drying the pulp and thus saving paying freight on 50 per cent. water.

This was my idea, too; therefore, I got up apparatus to accomplish this; sample of the dry pulp, as finished, enclosed herewith. This pulp is dried as quickly as the wet machine will deliver it, and as it has not been in contact with hot metal rolls, the fibre is not injured. This you can see for yourself by placing some of the sample in water for a moment or two, when you can pull it apart without breaking the fibre. I shall be glad to give you or Mr. Gagne any further information I can on this subject.

Yours truly,

F. C. CREAN.

Temple Building, Montreal.

PAPER-MAKING SCHOOL AT BURY.

The committee of Bury Technical School have arranged a useful series of lectures for the winter session, dealing specially with the important local industry of paper-making. The lectures will be illustrated by means of lantern slides, models, samples and experiments of an interesting and practical character. In addition to the lectures, advanced students with a knowledge of chemistry will proceed with practical experiments in boiling, bleaching, dyeing and production of hand-made patterns. The testing of materials used, and examination of papers to determine composition—fibres, loading, sizing, also physical properties and strength, thickness, opacity, stretch, C.B.S. units, etc.—will be undertaken. A valuable collection of microscopical slides of fibres and high-class papers made from the same are to be placed at the students' disposal. These include some fine specimens of British, American, Continental, and Oriental specialties in paper-making. During the

session, visits will be paid to the local works of well-known firms of paper-makers' engineers to inspect, under expert guidance, the new features and improvements of any new work or machines in hand. The committee of the school also secure the services of prominent trade experts to give occasional special lectures, which are highly appreciated and well attended.

A special feature of the Bury school is the three years' course of organized study for the various local trades. A student or workman in paper manufacture, for instance, of course acquires his practical knowledge by observation and daily contact with actual paper-making processes in the mill. If necessary, a preliminary year is spent at an evening continuation or night school, where arithmetic and other elementary subjects, as well as mathematics, are taught. These have a direct bearing on the higher classes in the sciences and technical subjects. The student afterwards proceeds to take up in the evenings special courses in chemistry, engineering, drawing, bleaching and dyeing, etc., under able direction during the three years at the school.

The paper-making lectures are given on Friday evenings and also, to meet the requirements of night workers, specially on Saturday afternoons. The preliminary work in the first year is very important, and essential to the success of technical education in any industry. Previously, the teachers and examiners of technical subjects have been faced and handicapped with the difficulty that some of the pupils were unable to take full advantage of the instruction given, owing to the fact that they had not been sufficiently grounded in preliminary work. The night schools not only afford young workers opportunities of continuing their education after leaving school, but also furnish the means by which older persons may remedy the defects of their early education.—Paper Maker.

The timber land concession of the Pacific Coast Wood Pulp and Power Co., of British Columbia, which is now being promoted in London, Eng., is in the vicinity of Powell River. It is expected that a start will be made by the erection of a sawmill in the spring.

The Jonquiere Pulp Company, of Jonquiere, Que., shipped eleven cars of cardboard and made 180 tons ground-wood in the week ending 15th inst., the best since the company has been in existence. With a new dam put in under the directions of Alex. McDougall, of Ottawa, and some 350,000 logs in front of the mill, the coming year's business of the company should be all that can be desired.

Although the capital of the By-Products Co., associated with the French-Hickman Flax Fibre Co., has been exhausted, the chairman of the latter company, in London, states that it is the intention to keep the Dakota mill running for the present, and the company will advance money enough to keep the Niagara Falls mill in order. This mill was built to make paper from flax waste by the process patented by the company, and if the process proved a success, it was the intention, we understand, to extend operations to Canada, where raw material is plentiful.

A Dominion charter has been granted to the "Canada Flax Fibre Co.," of Montreal, capital, $100,000. The incorporators are: T. H. Tombyll and R. N. Tombyll, manufacturers; James Walker, hardware merchant; George A. Childs, sales agent; J. H. Sherrard, manufacturer; S. P. Howard, freight agent; T. E. Howard, sales agent, and C. E. Scarff, druggist, all of Montreal, and George W. Fowler, barrister, of Sussex, N.B., and the company has power to acquire plant and machinery for the treatment and manufacture of flax, and its various products, "woven or otherwise." It does not appear that the company has any connection with the Flax Pulp Co. or the French-Hickman Flax Fibre Co., recently exploited in England and the States.

PULP AND PAPER MARKET.

The demand for pulp is now very brisk, and although all mills are running full, there is some difficulty in supplying the demand. Some makers have been holding their pulp for higher prices, and though they may gain somewhat in this respect, it is probable that they will lose as much through deterioration of the pulp due to heating and moulding.

In the United States the supply of ground-wood continues scarce, and very little, if any, is to be had, except at very high prices. Large purchases of pulp have been made in Canada recently by the International Paper Company and the Berlin Mills Co., of Berlin, N.H.

As to the situation in papers, the Paper Trade Journal summarizes as follows: The demand for the various grades continues steady at the old quotations. As this is the season of heavy consumption all grades are moving well, but none of them can be said to be active. Prices continue firm with a tendency upward. The demand for newspaper is gradually increasing. The better grades of book papers are said to be growing stronger in response to an enlarged demand. The cheaper grades of book remain unchanged. Writings are moving better, as the business of printers and stationers is now more active. The mills making writings are now running full. Because of the activity of general business the movement in Manilas is considered very good. In the cheaper grades of wrappings the market is not in good shape, rather low quotations prevailing in the ground-wood Manilas. The No. 1's are comparatively quiet for this season. The No. 2's are said to be practically out of the market, as there is little of this grade being made. Tissues, which have been growing in strength for a number of weeks, are now scarce and very firm. Side runs of news are scarce. The situation in box boards is still unsettled.

Pulp prices are quoted as follows in

New York: Ground-wood, $16, f.o.b., pulp mill; domestic bleached sulphite, $2.50 to $3.25 per cwt.; unbleached, $1.85 to $2.10; foreign, bleached, $3.35; unbleached, $2.15 to $2.25.

On the British market prices are quoted thus: Mechanical, moist, £2 to £2 2s. 6d.; dry, £4 5s. to £4 10s.; sulphite, bleached, £12 to £12 5s.; unbleached, £9 to £9 10s.; soda, unbleached, £8 to £8 5s.

BRITISH CHEMICAL MARKET.

Market is steady. Quotations are nominally as follows:

Alkali, ammonia, 58%	£ 4	15	0
Alum, lump, loose	5	0	0
Alumina, sulphate	3	10	0
Bleaching powder, 35%	4	15	0
Borax, crystals	13	0	0
Caustic, white, 76%	10	10	0
Caustic, white, 70%	9	15	0
Caustic, white, 60%	8	15	0
Soda ash, carbonated, 52%..	6	2	6
Soda ash, carbonated, 48%...	6	0	0
Soda ash, caustic, 48%	6	5	0
Sal ammoniac (1sts)	42	0	0
Soda crystals	3	2	6
Sulphate of ammonia	11	17	6
Sulphate of copper	20	0	0
Sulphur, rolls	6	12	6
Sulphur, flowers	7	12	6
Sulphur, recovered	5	10	0

SCANDINAVIAN PULP TRADE.

Reports to hand from Scandinavia mention the uneasiness of manufacturers of mechanical wood pulp in regard to the water supply, and already the scarcity experienced has necessitated a serious reduction in the output. Consequently, higher prices are now demanded, but, at the moment, business with Great Britain is very small, mills on this side apparently holding large stocks. The present conditions, however, must strengthen the position of exporters. Not only has Germany (where a water scarcity has

been experienced), bought largely of Scandinavian pulp, but local paper mills—whose own pulp mills have been forced to shut down—have had to buy in the market. In the Drammens district the level of the water is very low, and we are advised that four mills had to reduce production. We quote from a communication received relating to a mill making about 10,000 tons moist mechanical per annum:

"The position is so serious that we would rather not enter into any contract for delivery in the late autumn and winter, because we fear we may not be able to deliver owing to deficiency in the supply of water."

The above works have a great productive power, and the turbines are of the most up-to-date kind. In substantiation of the statement that local mills have had to secure outside supplies, a Drammens correspondent writes: "A sale was made the other day of 300 tons to an inland paper mill, whose pulp mill had stopped on account of shortness of water, and this will also be the case with many others."

A report dealing with another mill, also making about 10,000 tons of moist per annum, announces that already "a reduction of 25 per cent. in output has been made owing to the water in the Drammens river continually sinking." The western part of Sweden, which in normal years is never subject to any shortness of water, is also affected, as the following communication shows: "The water is continually sinking, and our mill has already stopped one stone, in order to stretch out the remainder of our reserve supply of water as long as possible. In the Bægna district the shortness of water has likewise commenced, and the mills have besides to shut down from Saturday till Monday night, so that the floating of the logs can take place. Fredrikshald and Wermland are in a miserable condition, only Skien and Larvik having still full supply of water."—World's Paper Trade Review.

NEW INCORPORATIONS.

Commercial Publishers, Limited, has been incorporated in Toronto with a capital

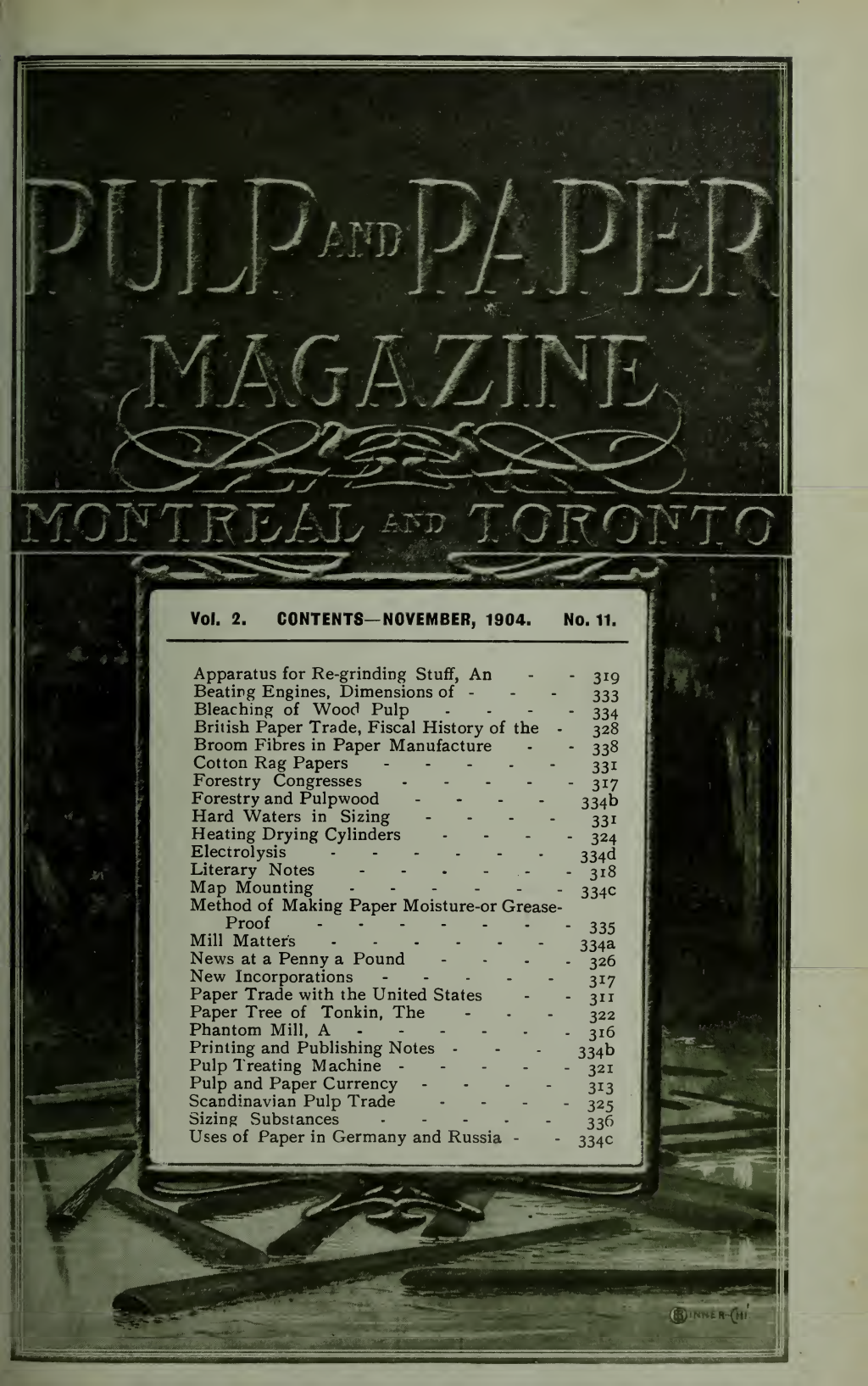
of $200,000. The provisional directors are: C. B. Murray, A. W. Holmsted, J. Milne, F. W. Holmsted, and D. A. Brebner.

A Dominion charter has been granted to the Haskell Lumber Co., to carry on a

general lumber and pulpwood business at Monte Bello, Que. The capital of the new company is $400,000. The directors are: W. L. Haskell, of Ulysses, Pa.; M. S. Haskell, of Herring, Pa.; D. R. Cobb, of Syracuse, and others.

The business of the Port Arthur Chronicle has been incorporated as a joint stock company, known as the Chronicle Printing Co. of Port Arthur, with a capital of $40,000. The directors are: George Hodder, J. T. Emmerson, F. B. Allen, G. F. Hourigan, and A. J. McComber.

A Dominion charter has been granted to the British-Canadian Bank Note Company; capital, $500,000; headquarters, Ottawa, to carry on the business of steel plate engraving, printing and book-binding, bank notes, bonds, stock certificates, postage and other stamps and all documents of an artistic or monetary or commercial value in all of their branches; to carry on a general engraving, lithographing, photographing, electrotyping, printing and publishing business in all branches; to carry on the business of paper manufacturers and importers and dealers in all materials and machinery. The charter members are: W. McLea Walbank, vice-president and chief engineer of the Montreal Light, Heat, & Power Co.; G. F. C. Smith, late manager Liverpool and London and Globe Insurance Co.; A. Ramsay, wholesale merchant and manufacturer; G. N. Ducharme, capitalist; R. C. Smith, advocate, K.C.; H. Laporte, Mayor of Montreal and wholesale merchant; Hanson Bros., investment brokers; R. Wilson-Smith, financial agent; R. A. Dunton, notary; Robert Bickerdike, M.P., insurance agent; Alphonse Racine, merchant; Victor Geoffrion, M.P., advocate; James Morgan, merchant; R. R. Stevenson, merchant; S. Carsley, merchant, all of the city of Montreal, and James W. Woods, manufacturer; D. Murphy, M.P.P., director Bank of Ottawa, and H. K. Egan, managing director Hawkesbury Lumber Co., all of the city of Ottawa.



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The Natal Government offers a first reward of $8,500 and a second reward of $2,500 for the first manufacture of paper to the value of $25,000 made in one year. Natal is said to possess good, natural paper-making fibre, cheap coal, first-class water, and low price unskilled labor.

—The Board of Customs recently handed out its decisions in some disputed cases, some of which are of interest to the paper trade. Regarding the duty on bleached straw pulp, it was declared that pulp of wheat straw and pulp of the straw of other cereals are liable to duty at 25 per cent. ad valorem. A question having been raised as to whether the weight of paper bands on cigars should be included with the cigars in the weight for specific duty, the board declared that cigars with paper bands may be entered for duty excluding the weight of the band in computing the specific duty, but collecting duty ad valorem on the band, the value of which should be included in the invoice price of the cigars.

—C. E. Sontum, Canadian Government agent at Christiania, writes to Ottawa as follows: It now seems quite certain that there will be a water scarcity in the Norwegian rivers during the coming winter, so the pulp mills will have only a very small chance of being kept running continually, as the frost has already set in on the mountains, which are also very dry after the long drought, which still continues. Also in Germany there is a water scarcity, so that country must buy more pulp from Scandinavia than usual, and the prices are advancing, kr. 75 or $20, being now asked for dry pulp. In a separate meeting of Swedish and Norwegian cellulose makers, it was decided to start a common office for the collection of statistics of production, of sales and of selling prices. The office will have its seat at Gothenburg, Sweden, and was to open on October 1st.

THE

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Pulp and Paper Magazine

A monthly magazine devoted to the interests of Canadian pulp and paper manufacturers and the paper trade issued between the 15th and 20th of each month.

SUBSCRIPTIONS: Canada, Great Britain and the United States, $1 a year; to Foreign Countries, 5s. a year.

Changes of advertisements should be in the publishers hands not later than the 10th of the month, and, where proofs are required, four days earlier. Cuts should be sent to the Toronto office, by mail, not by express.

BIGGAR-SAMUEL, LIMITED,
PUBLISHERS
18 Court St., TORONTO. Fraser Bldg., MONTREAL

PAPER TRADE WITH THE UNITED STATES.

Since the anti-dumping regulations have been put into shape, United States paper manufacturers who have been cultivating the Canadian market are somewhat anxious as to the effect of these regulations upon their particular trade. Upon the complaint of the Canadian Press Association, about four years ago, the Dominion Government investigated the conditions of the paper trade, and the commission in its report brought in a finding that a "combine" existed among the Canadian paper manufacturers as to prices of news. In consequence of this finding, the duty on that class of paper was reduced from 25 per cent. to 15 per cent., when valued at not more than 2½ cents per lb. This, it was thought by the newspaper publishers, would enable a number of publishers in the towns near the United States border to get in their supplies from United States paper mills, while in the case of the Maritime Provinces, imports could be made also from Great Britain. But one of the effects of the Spanish-American war was to increase the home consumption of news in the United States, and a drought at the same time contributed to increase the price to such an extent that no attention could be paid to the Canadian market by United States makers. Nor could British makers land news in Nova Scotia, New Brunswick, or Quebec at prices to compete with Canadian manufacturers. On the other hand, the conditions were more favorable to cheaper production in Canada, and so it has come about that the reduction in duty not only failed to displace Canadian news from its home market, but to-day the Canadian mills can produce news paper as cheap, quality for quality, as any country in the world, if not cheaper. The limitations of the home market and the relatively greater distance to the large markets of Europe are the only things that prevent an enormous increase in the output of Canadian news. There is no reason why other neutral markets, such as South America, Asia, Africa, and Australasia cannot be

developed, if the raw material of Canada is used in Canadian mills. For example, one United States concern derives from Canada 200,000 cords of pulpwood out of the 600,000 cords it uses, and such concerns, while maintaining the price in their own market, dump their surplus product on the foreign markets, making the more effective use of the cheap raw materials they get from Canada to accomplish these ends. It is contended that if it were made necessary that these concerns should manufacture in Canada then this country would get the benefit of the capital and labor employed, and that the benefits of the export trade would be retained by Canadian merchants and shippers.

Inasmuch as Canadian news mills have nothing to fear from United States makers under present conditions, there is no need to invoke the anti-dumping law for this class of papers, but the imports of book, writing and coated papers from the States are large and increasing, and the question of the valuation of these classes of papers is now being looked into. Should it appear that British exporters to this country are more honest in their declarations of values than United States exporters, the former will derive an advantage under the anti-dumping law, seeing that the preferential tariff of Canada favors them by a reduction of a third off the general tariff. British paper makers, apparently, have not yet fully appreciated the advantages given them under our preferential tariff, or they would have made greater headway than they have during the past three years.

Elsewhere in this issue will be found some figures on the advance of British trade with Canada in papers during the past three years. For the purpose of comparing the relative advance of the United States in its dealings with Canada, we give, from United States official sources, some figures of exports and imports:

UNITED STATES IMPORTS FROM CANADA.

Nine Months Ending Sept.	1902.	1903.	1904.
Books	$33,295	$27,451	$ 39,562
Music, maps, engravings, etc.	38,966	39,990	37,372
Paper stock (rags, etc.)	77,928	81,083	109,470
Paper	Not specified.		
Wood pulp, tons	10,649	64,053	23,536
Wood pulp, value	1,136,337	1,383,759	981,053

UNITED STATES EXPORTS TO CANADA.

Nine Months Ending Sept.	1902.	1903.	1904.
Books, maps, engravings etc.	$1,070,099	$1,222,197	$1,421,043
Paper, all kinds	1,073,985	1,165 405	1,405,659

The figures under the last heading are of the exports of goods of United States production, and do not include foreign goods re-exported. The Canadian Government returns are made up for the fiscal and not the calendar year, so that the above figures cannot be checked by our own official reports. The Canadian returns for the first three months of this fiscal year ending September, show the following imports from Great Britain (under the preferential tariff), and the United States:

Three Months' Imports.	From Gt. Britain	From U.S.
Photographers' paper	$ 2,987	$ 34,059
Paper bags, etc., printed.	345	13,789
Playing cards	5,880	7,081
Cardboard, in sheets	1,797	16,851
Envelopes	3,576	16,026
Paper felt and straw board	1,056	40,234
Wall papers	731	11,962
Leatheroid	....	4,584

Mill board	291	9,715
Pads (unprinted), papier mache, and other papers not specified..	43,826	139,339
Printing paper, dutiable at 15 per cent.	....	1,170
Printing paper, dutiable at 25 per cent.	37,760	54,276
Ruled, border and coated papers	6,523	29,461
Strawboard, in sheets...	124	1,355
Wrappings	941	8,002
Other papers not specified	32,443	85,761
Wood pulp	82	18,952
Bibles and Prayer Books (free)	50,382	18,184
Text books (free)	20,214	45,622
Technical books (free)..	3,575	19,838
Bookbinders' cloth (free)	8,261	4,004
Newspapers and magazines, unbound (free).	8,155	37,673

Our records show that there were shipped from Canada to the United States in the three months, ending September, 205,721 cords of pulpwood, valued at $908,-103, but none to Great Britain. Of wood pulp, we shipped to Great Britain in the same time $215,356, to the United States, $574,826, and to other countries, $721.

It will be seen from the foregoing that there is only one item, besides Bibles, in which British exports to Canada exceed those of the United States, while the disparity in other items in favor of the United States is very marked.

Pulp & Paper Currency

One of the forestry officials of Maine now comes forward with the statement that the natural growth of timber in that State is greater than the present ratio of consumption. If so, Maine will soon become the chief centre of pulp manufacturing for the United States, for the same is not alleged of any other State. Meanwhile, United States paper and pulp manufacturers are quietly securing desirable pulp timber limits in Canada, even at the relatively high prices now ruling. Sir Alfred Harmsworth, who has recently secured large pulp areas in Newfoundland, is of opinion that the United States will soon exhaust its pulp lands. Commenting on other opinions of the same sort, "G. A. F.," in the World's Paper Trade Review, writes: "Canada would do well, while there is yet time, to take a leaf out of the book of the United States' experience, and wisely conserve, as well as utilize, with discretion and foresight, the existing, but by no means inexhaustible wealth of its magnificent forest resources. In this connection there is a point which is apt to be overlooked. It was very much overlooked in the United States, until, indeed, it was too late to wholly remedy the wastefulness and wanton mischief thoughtlessly wrought. In the State of Maine alone, which, as I have indicated, has always been one of the greatest, and, will be, prospectively, the greatest of the pulp wood producing States in the American Union, there was formerly no demand for the timber of trees other than those of goodly size and straight growth. Then a cord of cypress would fetch the lumber man only a matter of $7 or so. The same quantity for paper-making purposes will net him to-day some $40. This next advance is easily explained. For pulpmaking purposes, branches, or gnarled and twisted trees are just as good as the straight ones, for the pulp mill is not at all particular as to what it chews up if only it be spruce—spruce, that is by preference. Formerly the lumberman passed over these as being unfit for the lumber mills. He left the young tree and those that were not of the straightest contours. But since the pulp mills' demand asserted

itself, the young and the maimed and the crooked in sprucedom came down as did the forest giants, to feed the insatiable macerators from which they issue as pulp."

A rumor having started in a Halifax paper that the Harmsworths had abandoned the idea of securing timber areas in Newfoundland for their proposed pulp mills, B. F. Pearson, secretary of the Timber Estates, Limited, wired from Boston to the Colonial Premier that Sir Alfred Harmsworth would purchase as he intended. One of the St. John's papers gave currency to the rumor of abandonment, whereupon a colonial contemporary announced that the Timber Estates were bringing an action for libel against the paper. The announcement was supplemented by the following comment: "Apart from this, we would call the attention of the electors to the fact that the alien 'tramp,' who edits that vile sheet, positively gloats over the idea of the venture being abandoned, as thereby thousands of deserving Newfoundlanders would be deprived of a livelihood." Genial chaps those island editors!

At the recent annual meeting of the French Paper Makers' Association, the question of the moisture in wood pulp was once more discussed. It was decided to adopt the standard of 90 per cent., as in Norway and England, and not that of 88 per cent., which the Germans seemed desirous of forcing upon them, the only difficulty pointed out being that it was necessary to use fractions when calculating the total weight by adding the usual 10 per cent. In the course of the proceedings, it was stated that certain German pulp manufacturers were trying to deliver pulp, not by the ton, but by the wagon, the weight of pulp, these latter nominally contain, being not always adhered to, which resulted in the buyer often getting short weight, up to as much as ten per cent. The general opinion of the meeting was in favor of the adoption of the decimal system in making moisture calculations, but it was pointed out that the English practice stood in the way of a general adoption of this mode of procedure, the conservative Britons preferring to stick to their own customs in this as in many other matters.

Great Britain seems to hold her own in the paper trade this year. The total imports of all kinds of paper during the first seven months of this year were 5,434,933 cwts., valued at £3,664,509, against 5,325,794 cwts. in the like period of 1903 and 4,890,779 cwts. in 1902. The total exports of British made paper were 932,175 cwts., valued at £1,402,052, in the seven months of 1904, against 853,225 cwts. in the same period of 1903, and 796,474 cwts. in the seven months of 1902. There was also less foreign paper re-exported from Great Britain in these months, the figures being 107,887 cwts. in 1904, 118,291 cwts. in 1903, and 86,088 cwts, in 1902. The record of British exports to Canada was as follows:

Seven Months,	1902.	1903.	1904.
	Cwts.	Cwts.	Cwts.
Writings, printings and envelopes	19,164	25,270	37,255
Other kinds	3,082	4,323	5,579

Scandinavia occupies by far the largest place in the imports of paper into Great Britain, which in the seven months of this year took over 669,000 cwts. of paper "on reels" from Norway and Sweden, being a heavy increase over the figures of the two preceding years. The United States ranks next to Scandinavia in the supply of papers to the Old Country, the amount sent in the seven months of this year being 185,851 cwts., which, however,

shows a decline on last year, whereas the figures of most other countries show an increase. In paper "not on reels" Scandinavia also overtops all other countries, the exports to Great Britain being over 1,073,000 cwts., against 113,826 from the United States. Here, however, the United States returns show some increase.

It will be remembered that a mill was started a year or so ago at Orange, Texas, to make paper from shavings, sawdust and mill refuse from yellow pine lumber. After the original company had spent a good deal of money and apparently exhausted its capital, a new company, called the Yellow Pine Paper Mill Co., has been organized by J. W. Link, Dr. E. W. Brown, and others, who have employed E. S. Farwell, late of the International Paper Co., as manager, and is putting in $50,000 worth of machinery. "When the mill starts this time," says the Paper Trade of Chicago, "it will be on a permanent basis, the experimental stage having been passed and the system of making paper from yellow pine slabs, and shavings proven a distinct success."

The Moniteur de la Papeterie Francaise observes that although Great Britain exports more paper to France than she receives from thence, the sales of French paper makers are the more remunerative of the two. For example, last year the supplies to the British market despatched by France were 63,927 cwts. of the value of £211,415, whereas the French purchases of British paper were 82,376 cwts. valued at only £147,865.

Some months ago we directed attention to the field there was in South Africa for some lines of Canadian papers, under the preference given to Canadian goods. United States paper makers, without the help of a preference, are going to fight for an entrance into that market, and appear to be succeeding, as their exports there for the eight months of this year show an increase of $17,000 over the same period of last year.

At a meeting of the Paper Makers' Association of Great Britain last month, enquiries were made for the report of the tariff commission of some months ago, and members expressed a wish to see the evidence given by the paper men. It appeared that the paper trade committee was not ready with its report, and did not wish to give the evidence of individuals till the committee's report was published.

The Pulp and Paper Magazine is not a political journal, and is interested in the pending elections in Quebec only because of their special bearing on the pulp and paper industry. Those in the trade who are more than politicians feel that if the interests of the province had been considered some years ago by the Parent administration, millions of dollars would to-day be invested in this industry where thousands are under existing conditions, and that the potential wealth of the province in pulpwood has been made to serve the interests of a few United States pulp and paper men instead of the interests of a home industry. To some extent, no doubt, the owners of pulp lands and timber limits in the province have condoned if not abetted the squandering of this most valuable of all the natural assets of Quebec, for they have easily been persuaded that the present cent is more to them than the future dollar to their children. They and the public will wake up some day to the enormity of their improvidence, and perhaps the present elections will be the beginning of this awakening. The Provincial Government, in springing the elections, so as to take their opponents at a disadvantage, have overshot the mark, for the Opposition have de-

cided, as a protest against unfair methods, to take no part in the elections. The Parent Government will thus be left to meet the fate of the snake that had gorged itself on the chicken. The Opposition have left them to trip themselves, "that their heels may kick at heaven." It is a pity that the poor province should forever suffer at the hands of its prodigal sons. It is the more lamentable that the particular form of wastefulness in which the present administration has run its riotous course is one the full effects of which will appear only after the Parent Government has been relegated to the long catalogue of administrative failures. When the destruction of forests has reduced the valley of the St. Lawrence to an arid region subject to alternate drought and flood, and the dairy and stock-raising interests have been ruined along with the timber and pulp trades, then the improvidence of the present regime will be understood. But why should the people of the province wait till they have reduced themselves to this diet of husks before they reach this knowledge?

"A PHANTOM MILL."

It is said that on one occasion, George Augustus Sala being commissioned to write up a great state ceremonial, went to his hotel and called on his assistants for "a flask of whiskey and a few facts;" and from this material he evolved his lengthy and interesting description. Somewhat similar seems to have been the method of a political speaker at Rat Portage, in the recent election contest, except that he does not seem to have been particular about the facts. He is credited with having narrated the following: "At the time of the last local election, the Liberal party at Toronto published thousands of copies of an illustrated magazine, called the 'New Ontario Edition of the Toronto Daily Star,' and among other wise things said about the development of New Ontario, it was stated that 'at the Norman dam there was a pulp company in full working order, having a capital of $1,500,000 invested, that employed 500 men, that manufactured 40,000 tons of pulp every year and used 50,000 cords of wood every season.' Gentlemen, that mill sprang into existence at one turn of the machine. Thousands of copies of this paper were scattered broadcast over Eastern Ontario, in an endeavor to convince the people of Canada of the honesty of a Government that did not know the meaning of the word honesty. Hundreds of copies of this magagine were sent into Rat Portage, but as soon as the election workers of the Liberal Party read the news that a party pulp mill had sprung into existence at Norman, they decided that the voters of this place had better not know anything about it, and they decided that these 'Toronto Stars' had better be burned, and that is why Rat Portage has never realized that they have had a pulp mill at Norman for many years, employing 500 men."

The story found its way to New York, and the Paper Mill of that city commented on the "Phantom Mill" of Rat Portage. The story proved so fascinating that the Pulp and Paper Magazine followed it up, but soon found itself out of the enchanting realm of fiction and face to face with cold facts, which follow.

The Toronto Daily Star published a New Ontario edition in May, 1902, in which it said: "The following is a list of agreements entered into with different companies, and the amount agreed to be invested." Here follow seven items, one of which is: "Keewatin Power Co.; capital to be invested, $1,500,000; employees, 500; capacity, 40,000 tons per annum; wood used yearly, 50,000 cords." A further paragraph stated that "nothing has yet been done in the construction of mills by the Keewatin Power Co., although the sum of $500,000 has already been expended on their water-power on the Winnipeg river."

Investigation at the Crown Lands Department revealed the fact that the agreement between the Government and the

Keewatin Power Co., Limited, was dated April 4th, 1901, and one clause reads: "If the company shall not within three years from the date hereof expend at least the sum of one million, five hundred thousand dollars in erecting the said pulp mill and paper mill and other necessary plant . . . this agreement shall become null and void, and of no effect so far as the whole territory is concerned." Three years have passed; the company has not erected a mill; hence the agreement has lapsed.

Rat Portage may resume the even tenor of its way. The Phantom Mill, which has disturbed its peace of mind, does not exist, and the pulpwood has reverted to the Crown.

FORESTRY CONGRESSES.

Preliminary arrangements have been made for the annual meeting of the Canadian Forestry Association, to be held in Quebec on 9th and 10th March next. The programme has not been definitely arranged, but it is understood that considerable prominence will be given to speakers from Quebec and the Maritime Provinces. Heretofore, the Association has always met in Ontario, and it has been felt that this province has rather monopolized the stage. The Association now numbers about six hundred members in all parts of the Dominion, and a number of foreign countries. One of the most recent additions to the life membership is Prince Colloredo-Mannsfeld, of Austria, who has been visiting Canada recently, and takes a great interest in forest management, as he has large forest estates in Bohemia.

The Association has decided to issue a "Forestry Journal," which will appear in Ottawa in January. Dr. Wm. Saunders, Professor John Macoun, and E. Stewart were appointed an editorial committee, and R. H. Campbell as editor and business manager. The new journal will include scientific and descriptive articles relating to the Canadian forests and their management, forest administration in other countries, the planting and care of trees and such other related subjects as are of public interest. The aim will be to present the subjects in a popular style, so that it may appeal to the general public as well as to the scientific student. The number and standing of the contributors already secured give promise that the character of the magazine will do full credit to the Association and worthily represent forestry interests.

E. Stewart and R. H. Campbell will represent the Canadian Forestry Association at the Forest Congress to be held in Washington, in January.

Another forestry convention of scarcely less interest to Canadians is a special congress of the American Forestry Association to be held at Washington in January next, commencing on the 2nd, and lasting till the 6th. Among the subjects to be considered are the relation of forest land to irrigation and to grazing, the importance of forestry to mining and the railway interests, and the relations of the nation and the state to forest policy. A number of delegates are expected from Canada, representing the Canadian Forestry Association, and the Dominion and Provincial forestry services. Various associations will be represented, and it is expected that several hundred will be in attendance.

The fact that the President of the United States will address the Congress and receive its members is significant of its national importance, while the promised attendance of many of the foremost men in industrial life in the United States assures definite and far-reaching results from its deliberations. The programme will be of especial interest to lumbermen and pulp men by reason of its dealing throughout with the more profitable use of the forest. The president of this Association is the Hon. James Wilson, Secretary of Agriculture, and the secretary, William L. Hall, Atlantic Building, Washington, D.C. Correspondence should be addressed to the latter.

NEW INCORPORATIONS.

The Vehicle Trade Publishers, Limited, is the name of a new corporation, with headquarters in Toronto, formed

to take over the Canadian Implement and Vehicle Trade, now published by P. G. Van Vleet, and to carry on a general printing and publishing business. The incorporators are: P. G. Van Vleet and John S. Murray, publishers; Jas. P. Langley, accountant; Edward M. Wilcox, editor; and D'Arcy D. Grierson, barrister, all of Toronto. The capital of the company is $50,000, and the provisional directors are Messrs. Van Vleet, Murray, and Wilcox, mentioned above.

Martel's, Limited, has been incorporated in Winnipeg, with a capital of $100,000, to carry on an engraving, publishing and fine art printing business. Wm. A. Martel, Mark Fortune, J. A. Banfield, Hon. Colin H. Campbell, and Hon. Robert Rogers are the provisional directors.

The Northern Power and Lumber Co. has been incorporated in British Columbia with a capital of $50,000 to purchase and operate the plants of the Northern Lumber Co. and the British Columbia Power and Manufacturing Co., both at Atlin. The new company has very broad powers, among which is the right to make pulp and paper.

The St. John Times Printing and Publishing Co. has been incorporated under the laws of New Brunswick with a capital of $100,000. The incorporators are: John Russell, Jr., merchant; Wm. H. Murray, manufacturer; John E. Moore, merchant; James V. Russell, merchant; Howard D. Troop, ship broker; James Kennedy, merchant, all of St. John; and James Robertson, merchant, of Millerton. The St. John Times is a new evening paper succeeding the Gazette.

LITERARY NOTES.

A circular to hand from the Michigan Agricultural College outlines the forestry course offered there, which covers a period of four years. The first two years are the same as for agricultural students, and farm forestry with general subjects makes up the work. In the third year the forestry students take up technical studies, and besides regular work carry on original investigations. The forestry department manages 200 acres of the college farm, and an arboretum is being established. The forestry department proper was not organized until September, 1902, but it now counts about thirty professors and assistants, and is well equipped in every way. Over seventy students were enrolled last year.

The Printing Art, "a monthly magazine of the art of printing and of the allied arts," is published by the University Press, Cambridge, Mass. The November number, just to hand, is attractive from cover to cover. Among the notable articles are: About Sizes of Books, Styles in Lettering, and The "Three-Color" Process. The magazine is illustrated throughout with splendid specimens of printing. In the current number there are examples of the colortype process, the three-color process, color and design in pamphlet pages, and illustrations of border treatment of half-tones, besides specimen catalogue covers, and a good number of advertising pages, arranged in an interesting and attractive fashion.

—A consignment of 1,800,000 bags, the largest consignment that ever entered British Columbia, was recently received by Hibben & Co., of Victoria, from the Continental Bag Co., of Rumford Falls, Me., for which concern the Hibben Co. are British Columbia agents.

Dr. J. F. Clark, provincial forester for Ontario, is delivering a course of lectures in farm forestry at the Ontario Agricultural College. The course was planned to last about three weeks, but may be extended. Several students have expressed a desire to take a full course in forestry, and unless a forestry school is opened in this country, they will be forced to go for their training to one of the United States schools, which, of course, introduces the danger that Canada will lose their services entirely.

AN APPARATUS FOR RE-GRINDING STUFF.

Among the patents recently issued in the U.S.A. is one to Solomon R. Wagg, of Appleton, Wis., for improvement in apparatus for returning stock to refining engines. The object of the invention is to provide means in connection with the ordinary Jordan or other type of refining engine for returning the stock, or a portion thereof, which is passed through the engine, back to the same for re-grinding, to provide means for returning said stock for re-grinding at different points in the engine whereby it may be reground to a greater or less extent, to provide means for regulating the amount of stock to be returned to the engine, and to provide means for withdrawing the stock at different points in the engine for the purpose of returning it to the same.

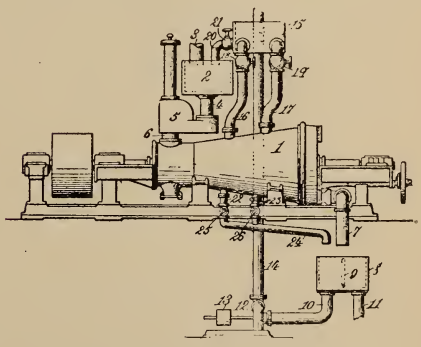
In the accompanying drawing, the figure represents in side elevation a refining engine of Jordan type provided with the improvement.

Referring to this drawing, 1 indicates a refining engine; 2, the box containing the stock for supplying the engine; 3, the pipe for feeding stock into the box 2 from a chest containing the stock; 4, a pipe leading from the box 2 into the sand catcher 5; and 6 a pipe leading from the sand catcher into the inlet end of the engine. These parts are of the usual well-known construction and need not be described more in detail. Also the engine as a whole is mounted and operates in the ordinary manner, and a description in this regard is unnecessary; 7 indicates the outlet pipe from the engine. This pipe has its discharge end located a slight distance above the separating-box 8, which is provided with a swinging partition 9, mounted on the bottom of the box 8, centrally thereof.

The box 8 is provided in its bottom on either side of the partition 9 with two outlet-pipes 10, 11. The pipe 11 leads to the machine-chest, and the pipe 10 leads to a pump 12, driven by any suitable means, as by a pulley 13. From the pump 12 a pipe 14 extends to a point a considerable distance above the engine 1 and communicates with a distributing-box 15 through the upper side thereof. From the box 15 pipes 16 and 17 lead to and communicate with the engine 1, the pipe 17 communicating with the engine near the outlet end thereof and the pipe 16 near the inlet end thereof. The pipe 16 is provided with a cut-off valve 18, and the pipe 17 with a similar valve 19. From the box 15 a third pipe 20 leads to and communicates with the supply-box 2. The pipe 20 is provided with a cut-off valve 21.

At suitable points intermediate the ends of the engine 1 there are provided in the bottom of the engine outlet-pipes 22, 23, communicating with a common pipe 24, which in turn discharges into the box 8 directly over the pipe 10. The outlet-pipes 22 and 23 are provided, respectively, with valves 25 and 26.

In operation stock enters the engine through the pipe 6, and passing through



the same, is discharged through the outlet-pipe 7. It will be noted that the swinging partition 9 has its free end located immediately under the discharge end of the pipe 7. By swinging this partition to one side or the other a greater or less amount of the stock passing from the pipe 7 may be caused to fall on one side of the partition and pass through the pipe 11 to the paper-machine, while the remaining portion of the stock will be caused to fall on the other side of the partition 9 and pass through the pipe 10 to the pump 12, whence it is forced up through the pipe

14 and discharged into the distributing box 15.

From the distributing-box 15 the stock thus returned may be caused to enter the supply-box 2 by opening the valve 21 in the pipe 20, the valves 18 and 19 of course being closed, and thus to pass again entirely through the engine, or the valves 21 and 19 being closed, the valve 18 may be opened and the returned stock caused to enter the engine through the pipe 16, and thus only pass again through about two-thirds of the engine; or, the valves 21 and 18 being closed, the valve 19 may be opened and the stock returned to the engine through the pipe 17, and thus passed again only through about one-fourth of the engine. The operation, it will be seen, is continuous, a portion of the stock leaving the engine constantly passing to the paper-machine chest, while the remaining portion is returned to the engine for further grinding.

By moving the partition 9 to one side or the other the amount of stock returned to the engine may be adjusted according to the character of paper desired to be produced, or according to the character of stock being refined. A still further variety in the treatment of the stock is offered by the outlet-pipes 22 and 23, for by opening one or the other of the valves 25 and 26 stock may be withdrawn from the engine in a partially-ground or refined condition and be discharged through the pipe 7 into the separating-box 8, where it will be mixed with the stock which has passed entirely through the engine, and a portion of said stock be returned to the engine for regrinding if desired, as usual.

It will also be seen that by turning the partition 9 to one side—that is, to the right in the drawing—all the stock passing from the discharge-pipe 7 may be returned for regrinding, while by turning the partition 9 to the left all of the stock may be passed from the engine directly to the paper machine chest without regrinding.

"It will be seen from the above," says the inventor, "that I provide for making paper containing long and short fibres, which may be perfectly blended, owing to the treatment to which the stock is subjected, as described herein, regrinding of the stock operating to smooth and repolish the same, so that the fibres may be more perfectly united and blend into an even-surfaced homogeneous sheet. Paper thus produced will take up printers' ink and will develop the fine lines of printing more perfectly than is possible with paper manufactured by the method now in vogue.

"To illustrate further the object sought it may be stated that the standard length of fibre passed through the Jordan engine is fixed at, say, fifty points. By the present manner of manipulating stock, as herein described, I produce fibre of variable length, approximating sixty-five points long and forty-five, thirty-five, or thirty, etc., short which in the process of regrinding will be caused to blend perfectly in the paper sheet, finer fibres when combined with the longer fibres giving to the paper superior strength, smoothness, and flexibility.

"According to the character of paper desired or the character of stock being treated I can by the means described vary the percentage of short fibres to long fibres, and by such means provide for a very large margin between the size of the fibres blended.

"I do not limit myself to the exact details of construction shown except as indicated in the claims appended hereto. Thus, for example, I may employ a worm or other well-known form of conveyor for returning the stock to the engine in place of the pump 12. Also I do not limit myself to any given number of extra inlets to and outlets from the engine. The arrangement whereby the stock is withdrawn from the engine at determinable points between its inlet and discharge is valuable in and of itself and may be utilized because of the value thereof separate and independent of the arrangement by which the stock is returned to the engine to be reground. Therefore this arrangement of with-

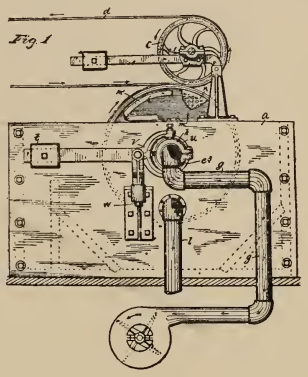
drawal is claimed by me as a novel invention."—Paper Mill.

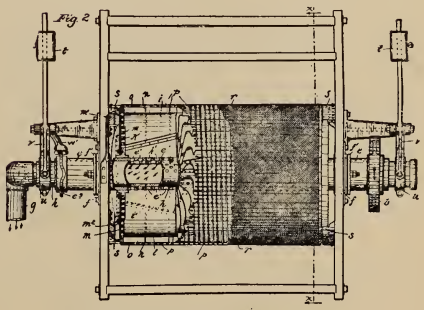
PULP TREATING MACHINE.

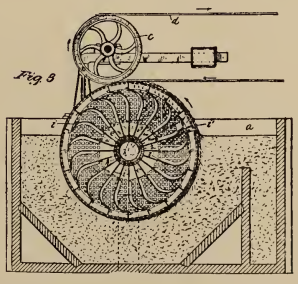
Howard Parker, of Bellows Falls, Vt., has patented in the United States a pulp treating machine.

In the accompanying drawings the letter *a* denotes the pulp tank, to which the pulp is supplied in any suitable manner. In this tank there revolves a cylinder having a perforated surface readily identified by the eye, which is rotated in some suitable manner, as by a gear meshing with the gear *b*, which is fixed on the same shaft with the cylinder. As the cylinder revolves in the pulp it takes a coating thereof upon its surface, which is pressed between the cylinder and the couch roll *c*, becoming thereby attached to the felt *d* and travelling on its surface to some proper destination, which may, if desired, be any proper part of a paper making machine.

The cylinder shaft *e* (to which gear *b* is fixedly attached) rotates in suitable bearings—as, for instance, in bearings *f*, carrying stuffing boxes *f'*. This cylinder shaft has perforations *e'*, which are primarily for permitting the working of a certain suction draft. A proper mechanism for producing that suction draft (see Fig. 1), is attached to the pipe *g*, which is in connection with a non-rotary pipe *h*, which is within the hollow shaft of the revoluble cylinder. In the upper part of the pipe *h* there are perforations *h'*, wherefore the suction draft is confined to the upper part of the cylinder and is confined to that portion of the cylinder which in revolution precedes its contact with the felt *d*. This suction draft draws the coating of pulp which is on the cylinder into regular and intimate contact therewith and to a substantial degree draws the water therefrom. The water passes through the perforated exterior part of the cylinder and into the interior thereof. There the troughs *i'*, which are on the wing arms *i*, catch the water, conduct it to one end of the cylinder, when it is delivered through the perforated cylinder head *k*, at the lower part thereof, whence it runs off through the pipe *l*. The water escapes thus from the cylinder at its lower part only, for it is necessary that



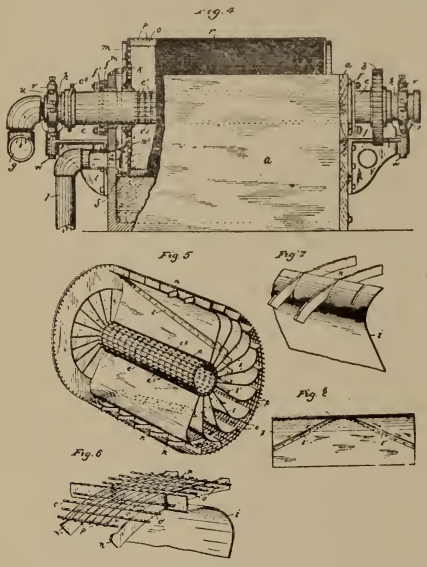




the upper part be closed for the maintenance of the suction draft already referred to. In order to bring that about, there is a flexible valve *m*, much like a gasket in shape and which may well be of rubber or rubber compound, which is attached by its central part to the perforated cylinder head *k*, being loose therefrom elsewhere.

At their inner ends the wing arms *i* are inserted in grooves e^2, which are cut

in the periphery of the cylinder shaft *e*. At the ends they are entered into radial grooves in the cylinder heads, as well seen in Fig. 5. At the outer edges they are held in secure relation to each other by being secured to the rings *n*. These rings *n* carry the crossbars *o*, which are entered at their ends into the cylinder heads. On their outer surfaces the crossbars *o* bear grooves or notches *o'* in a spiral relation to each other, and in them the wire *p* is laid spirally.



The letter *r* denotes a wire screen, such as cylinders for like purposes are often surfaced with, which is laid upon the exterior of the spiral wires *p* and forms the superficial part of the cylinder. The suction draft through the upper part of the cylinder is constant.

The letter *s* denotes a packing between the tank and the perforated cylinder head. It is fastened to a partiannular projection S' on the inside of the tank and presses against an annular flange projecting from the exterior of the perforated cylinder head.

The pipe *h* is slightly smaller than the cylinder shaft *e* which incloses it. The pipe *h* is kept pressed against the upper interior part of the cylinder shaft *e* by the counter-weights *t*. The letter *u* denotes the bearings of the shaft *h*, which are pivotally hung to the levers *v* (carrying the counterweights *t*), which are in turn pivotally hung to the rotatable shafts *w*.

The letter *w'* denotes a cam arm practically fast to a rotatable shaft *w*. This cam arm takes hold of the cam flange e^3, and the co-operation of the two gives the pipe *h* the back and forth movement already referred to.

Fig. 7 is intended to illustrate the construction of the rings *n*. One of these rings may be made of one entire piece; but preferably it is made in two parts, and it is that construction which is illustrated in Fig. 7. In that construction two bars of rectangular shape in cross section and of greater width than thickness are bent edgewise. Then by means of suitable milling or other machinery they are given the appropriate and proper contour.

In Fig. 8 the trough *i'* is shown as delivering at both ends of the wing arm instead of wholly at one end, as in the other figures of drawings. In case this trough is thus made to deliver at two ends both of the cylinder heads must be perforated and otherwise provided with means for the escape of the water.

THE PAPER TREE OF TONKIN.

The tree known in Tonkin under the name of "cây gió" is cultivated by the natives for the sake of its bark, which is employed in the manufacture of paper. This plant has been identified as Daphne involucrata, Wall., of the natural order Thymelæaceœ. It has long been used in India for papermaking, the bark being employed in admixture with that of the allied species, Daphne cannabina, the so-called Nepal paper plant. In Annam, an extensive area is devoted to its cultivation, amounting, in the Province of Hung-hoa alone, to about 670 acres. An account of the cultivation of the tree and the method of utilizing its bark has been contributed recently to the Revue des Cultures Coloniales, 1904, vol. 14, pp. 175-182 and 271-273.

The plant grows best in an alluvial

soil which is rich in humus and can be easily irrigated, and it readily accommodates itself to the changes of temperature of the Tonkin climate.

The following method of cultivation is practised by the natives. The seed is sown in February or March, according to the temperature. If the heat tends to injure the seedlings they are shaded with screens of palm-leaves. In the same period of the following year the young trees are transplanted at intervals of 30 to 40 inches in plantations which usually have an area of ¾ to 1½ acres, and rarely extend to 2½ acres. The branches are cut in August or September of the third year, before the plant has flowered; they have a diameter varying from about one-half to an inch and a length of 1½ to 2 yards. The number of branches borne by one tree is usually from five to twelve, but sometimes amounts to as many as twenty. After the branches have been gathered the leaves are removed and the bark is stripped off by hand, The product thus obtained has the appearance of soft, flexible, fibrous ribbons; it is dried thoroughly by exposure to the sun.

A tree of the age of three years yields, on the average, about 12 oz. of fresh bark or 4½ oz. of the dry material. Assuming the presence of 1,400 plants per acre, the yield of dry bark would amount to approximately 400 lbs. per acre. This quantity is the maximum obtainable by the cultural methods at present employed. The natives usually make four cuttings at regular intervals of three years; the second crop is of the best quality. At the end of twelve years the plant is exhausted and is then considered to furnish too small a yield to warrant its further cultivation. The bark in its raw state sells at different prices according to its quality; the first quality realizes about 24s. per cwt., whilst the lowest quality is sold at about half this price.

The total quantity of the dry bark produced annually in Hung-hoa amounts to about 120 tons. About 24 to 30 tons is used in the village of Pin-dinh for the manufacture of paper; the remainder is distributed among the following villages:—Vu-yên, 35 tons; Yen-luong, 15 tons; Van-phu, 35 tons; Thach-dé, five tons.

It is considered that the yield of fibre might be greatly increased by the adoption of improved methods of cultivation. Before transplanting the young trees, the soil should be well prepared and freely manured. The plants should be selected rigorously and only those should be transplanted which bear well-formed stems, and are provided with numerous roots. During the first year, the plantation should be weeded two or three times. In the second and third years occasional ploughing is required in order to clear the ground of adventitious plants and to allow of the admission of air to the lower layers of the soil; this treatment is particularly necessary if the soil contains much clay.

It is estimated that under systematic cultivation each plant would yield about 9 oz. of dry bark or double the amount produced by the native methods. Since an acre would probably produce 4,000 plants under these conditions, the total yield of dry bark would amount to about one ton per acre of the average value of £16.

In the village of Phi-dinh, Hung-hoa Province, the manufacture of paper is carried on by the following method. The bark of "cây gió" is immersed in water for 48 hours, and is afterwards soaked in weak milk of lime for the same length of time. Whilst still impregnated with lime it is submitted to the action of steam for 24 hours, and is afterwards washed and cleaned, and reduced to a pulp by means of a pestle and mortar. The pulp is again washed, and then transferred to a rectangular wooden vessel filled with water to which a gummy substance has been added derived from a tree known as "cây mo." The paper manufacturers purchase the wood of this tree from the native foresters who collect it in the mountains. The wood is converted into chips or shavings which are steeped in water for 12 hours.

The gummy water so obtained is poured into the wooden vessels in which the pulp is afterwards placed. About 1 lb. of "cây mo" shavings is required for 30 lbs. of the "cây gió" bark. The pulp is withdrawn, shaken, and spread out in thin layers. The sheets thus formed are placed in a pile which is pressed, in order to remove the excess of water. Finally, the sheets are separated from one another and dried in the sun. The paper obtained in this way is always more or less bibulous. The process of sizing paper, with the object of rendering it impermeable, is quite unknown to the natives.

In the village of Lang-buoi, near Hanoi, paper is manufactured in a somewhat different manner. The bark is macerated first in water and afterwards in lime water. It is then heated with water in a hermetically sealed vessel for three or four days. The two layers of which the bark is composed are next separated by means of a knife; the outer layer is brown whilst the inner layer is yellowish in color and more fibrous. The former serves for the manufacture of paper of inferior quality the latter being reserved for a finer, whiter, and less bibulous paper. Each portion is converted into a pulp by means of a pestle and mortar, and the pulp is transferred to large baskets and carefully washed with water. The product is put into wooden troughs provided with water which contains a certain amount of the gummy substance derived from "cây mo." The sheets of paper are then made in the manner already described.

There is another plant used in Tonkin for papermaking which bears the native name of "cây cánh," or the wild "cây gió." This is a small bush not exceeding 36 to 40 inches in height. The branches attain a maximum thickness of about half an inch; the bark contains a fibrous tissue, the fineness of which contributes to the production of pulp of very good quality. The plant has not been completely identified, but is recognized as a member of the natural order Thymelæaceæ. It grows in poor, dry, stony soil, and is able to bear the greatest summer heat without injury. "Cây cánh" has always been neglected on account of the small proportion of bark that it yields, and experiment has shown that notwithstanding the superiority of the paper made from this material the regular cultivation of the species would not prove remunerative. The pulp, however, might be utilized in combination with the ordinary pulp to improve the quality of the paper.

The paper mulberry (Broussenetia papyrifera), a plant indigenous to China, Siam, Polynesian Islands, and Burma, is frequently met with in Tonkin by the roadside, but its cultivation has never been adopted by the natives. This tree bears a greyish-brown bark which is greatly esteemed in Japan as a paper stock, is used in Burma for the manufacture of papier maché, and is employed in the Sandwich Islands and Hawaii for making native cloth.—Bulletin of the Imperial Institute.

HEATING DRYING CYLINDERS.

The practice often recommended of heating up drying cylinders when the machine is at rest may easily lead to a disastrous catastrophe. When a machine has been standing idle, as for example on a Sunday, the steam remaining in the cylinders when the machine was stopped condenses to water, which collects in the lower part of the cylinders and is augmented by the condensed water which leaks in from the steam pipes, as the valves seldom fit absolutely tight. In addition to this also, more or less water always collects in the cylinders, the amount depending upon whether the draining apparatus works well or otherwise. When, therefore, the cylinder is heated up, the bottom is covered more or less with cold water, and the part not in contact with the water heats up much more rapidly, and moreover, being itself cold to start with,

still further increases the total amount of water as it condenses the first portions of the steam admitted thereto. If, now, after a short time, the machine is started, the lower portion of the cylinder, which up to now has been covered with cold water, comes suddenly into contact with the hot steam, with the result that the brittle material is unable to withstand such a sudden difference of temperature, there being no time for it to adapt itself thereto, and the inevitable cracking of the cylinder and explosion follows. A terrible accident which occurred in a mill a few years ago was undoubtedly due to this cause. The best and surest way to avoid accidents of this nature is to first set the cylinders in motion, and then proceed to heat up, so that the draining apparatus may clear the cylinders of water before the steam is admitted. Only by so gradually heating up the cylinders in this way can the heat be uniformly applied, which is a matter of fundamental necessity if the operation is to be carried out safely.—R. Erchhorn, in Wochenblatt fur Papierfabrikation.

SCANDINAVIAN PULP TRADE.

(Correspondence of World's Paper Trade Review).

The position of the pulp mills over here is gradually becoming worse and worse. A number of mills have been obliged to stop entirely for want of water-power. In the Skien district the water-power has been reduced by the River Regulation Committee to 40 per cent. of normal power for all the mills situated at the head waterway in the town of Skien. In the Drammen district the mills are running with an average of one-third of the usual number of stones. The mills of Edward Lloyd, Ltd., Hönefos, are at present only using six to seven stones out of the twenty-one stones usually working.

If the rain so much needed should not appear in another month, the frost might set in and transform the rain into snow and ice, and in that case we may look forward to a winter with pulp mills shut up all round. It would be in March or April before the mills would then be able to start working again. This is, of course, taking a rather outré view of the position, as in all probability we shall have a good downpour of rain before the middle of November, but the chance of having no rain before then, how remote this chance may be, has not been without effect upon the sellers' views and upon the whole market.

The stock of prompt wood pulp may now be considered as cleared at satisfactory prices, and there is also very little left of wood pulp for shipment during the remainder of this year.

For shipment over next year the sellers have disposed of some very large quantities, I have heard mentioned about half of the total production, and it seems as if the advance in prices, which has undoubtedly taken place lately, will last for some time to come.

As long as, however, the sellers content themselves with a reasonable advance on late unprofitable prices, and the market rules steadily at these prices, there should be no bad feeling among buyers to have to pay these prices.

The purchase of logs is proceeding very slowly this autumn. The high prices paid during the last years still cling to the memories of the forest owners. These high prices have, however, never been brought about by the price paid for the finished article—wood pulp. The mill owners have been forced to compete with the saw mills when buying white wood logs, and as long as the prices paid for sawn and planed wood have been good, the saw mills have been able to pay high prices for logs. In order to secure the necessary timber the pulp mills have been forced to follow the lead.

During the latter years many of the pulp mills have from this reason invested some capital in forest property in order to regulate by this means the cost of their log purchases.

This autumn the wood market is throughout bad and does not allow the saw-mills to pay the same prices as before for their logs. The pulp mills are now trying to make use of this fall in saw-mill log values to bring the price of white wood logs down to a reasonable level. Whether they will succeed or not is at present difficult to say.

NEWS AT A PENNY A POUND.

If in the later sixties, after makers had got accustomed to esparto, and what they then thought cheap papers, any one had mentioned the possibility of "news" selling at one penny per pound, he would have been thought a pessimist, and probably called something worse. Yet the time has come, that if a maker cannot sell what is called the "common news" quality used for daily papers at something in the immediate neighborhood of that price, he is out of the running.

The position is sufficiently serious to all in the trade; for, if we as a nation cannot compete with our rivals in the two continents and make a reasonable profit, then the natural course will be adopted by present makers of "news" of trying other and higher qualities, thereby competing with other members of the trade whose product may be attended by more success in a profit-making sense, and with the inevitable result. In this way the present position of news makers is of interest to the whole body of the trade.

A proposition having been put forward that "news" can, under certain conditions, be made and sold at a profit at a penny per pound (net), and this, backed up by an account showing items of expense—not in such detail as one could wish, but giving specific items—and supported by an explanatory statement, it seems becoming in present circumstances to receive it with respect, and from the tone of his remarks the writer does not object to his general proposition being subjected to some sifting in a good natured sort of way. If the gift horse may not be looked in the mouth, perhaps a glance at his legs may be pardoned to see if he is fit to go.

In approaching the propositions general assent will be given to the statement that while there may be the same few mills that have been so altered and improved as to be able to compete successfully and profitably for the news trade, the bulk of our mills are not suited to meet present conditions. Nor is that surprising, when it is borne in mind that the greater number were erected and fitted up with plant for treating esparto and other fibres, and at a time when it was not thought of that all material might be furnished to beaters direct, without much previous treatment at the mill. The plant that has already been thrown out of many mills and lying unemployed at others, must be very great; a fact, by the way, that enforces the wisdom of writing off freely for depreciation.

It is obvious that a thoroughly modern mill adapted to present conditions as regards site, with machinery proved to be the best adapted to produce the greatest quantity of paper at the smallest cost, would be better able to meet the necessities of the position than many of our present mills.

How this is to be got is the question, and an examination of the statement and account showing cost of 20 cwts. news—estimated at £8 6s. 8d.—cannot be devoid of interest. Let it be noted that this is a manufacturing account, and is not concerned with questions of charges for capital, depreciation or reserves. And first let the output be assumed, though some would prefer a greater width of wire. Then as to speed, it would be interesting, and perhaps instructive, to have reasons specifically stated why we should stop short of the maximum speed run by our friends in the States and Canada.

On point of output, it might be suggested that the quantity (400 tons) might be attained on three machines with wider wires. And in these days of agitation for shorter hours, is it wise in estimating for the future to assume 132 working hours, with machines running 125? Would it not be safer to go on machines running, say, 120 hours? At speeds of 350, 400, 450, and 500 feet per minute, with a web of 110 inches and substance proposed (21 D.C.,

480), with 120 hours' work, the quantities at reel would be 108, 123, 139, and 154 tons respectively per machine per week. These and any other suggestions that may follow are thrown out, not by way of attacking the proposal, but rather to elicit the best thoughts in the trade.

The heaviest item in account is "raw materials," £5 1s. 3d. per ton, and it is of importance that there should be no misunderstanding on this head. We would have preferred to have had details of paper at machine reel, with the broke as deckle edges, etc., as well as the finished weight, and perhaps this may yet be given, as investigation is invited. The calculation we take to be something like this, the constituents of the made sheet to be: China clay, about 7 per cent., equals per ton, 157 pounds; wood pulp, about 93 per cent., equals per ton, 2,083 pounds; total, 2,240 pounds.

Then as to yield, say that 30 per cent. of the clay is lost, and as for the merchantable dry wood pulp (10 per cent. moisture), it is presumed that 95 per cent. is counted on to be got—size, etc., included—in paper with its natural moisture. This would work thus: China clay, 227 pounds at 70 per cent., 157 pounds; wood pulp, mechanical, 1,644 pounds at 95 per cent., 1,562 pounds; wood pulp, sulphite, 548 pounds at 95 per cent., 521 pounds; total, 2,240 pounds.

This shows 2,419 pounds of materials to a ton of paper, 21.59 cwts., or 11 pounds over estimate, and the cost, as below, 102s. 10d., instead of 101s. 3d., but the discrepancy is not very material. Cost of quantities as above: China clay, 227 pounds at 25s. per ton, 2s. 6d.; wood pulp, mechanical, 1,644 pounds at 4s. 6d. per cwt., £3 6s. 1d.; wood pulp, sulphite, 248 pounds, at 7s. per cwt., £1 14s. 3d.; total, £5 2s. 10d.

Regarding the furnish, some would be inclined to call what is proposed, 75 per cent. mechanical to 25 per cent. sulphite, rather extravagant and out of proportion to the product. An American furnish for common news before us shows 82 per cent. mechanical to 18 per cent. sulphite. Eighty per cent. and 20 per cent. is believed to be a customary furnish, and even 85 per cent. and 15 per cent. has been mentioned, but we have no wish to dogmatize, and merely note that if 80 per cent. and 20 per cent. could be considered suitable the cost could be reduced to 100s. 3d., thus: China clay, as above, 2s. 6d.; wood pulp, mechanical, 1,754 lbs., at 4s. 6d. per cwt., £3 10s. 5d.; wood pulp, sulphite, 438 pounds at 7s. per cwt., £1 7s. 4d.; total, £5 3d.

Without wishing to be critical in remarks, might experience not question the yield named, 95 per cent. for the pulp, as rather high, and the more so as it is understood that we are dealing with finished paper, reeled or reamed, without taking into account broke returned to mill, as deckle edges, etc.? Even with best pulp saving plant, some fibre must go with the effluent water.

Alum and size, 4s. 6d. per ton, or on week, £90. In estimates of this kind it is generally advisable not to slump items, but roughly we fancy 3s. and 1s. 6d. will be meant, or about 130 to 140 pounds alum cake and 30 to 40 pounds rosin. Does this assume the mill making its own size or using prepared size? Some insist that they are better, more regular in sizing and cheaper buying size made and ready for use.

Wages, 14s. per ton; £280 per week. This charge must of necessity depend much on the plant, and the only way it can be judged of, or a correct opinion formed, would be by having made out a list of departments and plant, each named and a suitable wage put against each person. Wages vary somewhat in different districts, and what would be a suitable wage in Scotland would not be accepted, say, in Lancashire or the neighborhood of London. So much will depend on the nature of the preparing plant up to beaters, and the facilities for storing and handling pulp, that it is difficult to form an opinion as to the adequacy of 14s. per ton, but we would be inclined to think the estimate a low one. At the same time there seems to be room for economy in some mills, where the beaters are filled by men with shovels out of stuff boxes, and where the

pulp is steeped and broken in edge runners. On 194 persons the average wage would be 29s. per week. On this and indeed on many other items authority must guide, if experience cannot modify.

Up-keep and repairs, 5s. per ton, £100 per week seems at first sight low to provide for materials, staff of mechanics, joiners, etc., breakages, etc., but those accustomed to news mills must decide. Coals, 22 cwts. per ton at 12s., 13s. 2d. per ton, £264 per week.

We will not go into the question in the meantime that has been raised as to what is necessary to dry the paper, and as to power, but would not be surprised if 22 cwts. of good coals might be found sufficient for a ton of paper. We know of a case where a ton of news and common printings is made with less than 40 cwts. of very inferior coal, and costing per ton of paper about 12s. It would be well, however, to have this question of drying and power thrashed out, and the figures made clear on which the estimate is based. The writer of the paper, however, seems to found on what has been, as well as what he is convinced can be done with improved machinery.

Wires and felts, 5s. per ton, £100 per week. We will not be far out in assuming 1s. and 4s. respectively. How long for a wire running 400 or 500 feet, and average quantity per wire? Wrappers and thirteen other items, 5s. 7d. per ton, £111 13s. 4d. per week. These may be founded on experience, and must be accepted as result of examination into accounts of other mills, but it must be said they seem low. If the items were given in detail there might be something to lay hold of. Carriage, 9s. per ton, £180 per week, must depend entirely on site and its contiguity to market. Management, salaries and travelling, 4s. per ton, £80 per week, should be sufficient. Insurance, rates, taxes, rent, London warehouse, 5s. 2d., £103 6s. 8d. per week. These will much depend on cost of mill, ground rent, amount fixed on which rating charged, etc. Though classification of accounts may differ, it is to be presumed that each item, as bars and plates, tools, commissions, miscellaneous charges, advertising, have not been lost sight of.

Subject to what has been said as to want of details, the account is calculated to encourage investigation as to the reason why others can evidently produce cheaper paper than we can, and it would be interesting and highly desirable to see American and Scandinavian figures put down alongside those here given. To the most conceited there is always some advantage in measuring and comparing ourselves with our opponents. Be the estimate correct or otherwise, it affords basis of comparison, and gives opportunity for our students of paper making of putting forward their views and showing themselves more men of affairs than merely laboratory hacks. The communication also emphasizes the necessity of news making being specialized. Had the statement been in the hands of Mr. Moseley's commission, some interesting information might have been got as to the expense of some of the items in the United States and Canada.—World's Paper Trade Review.

FISCAL HISTORY OF THE BRITISH PAPER TRADE.

The Free Trader of London, Eng., has an article on "Protection for Paper, from the Free Trade Point of View." The writer thinks that with respect to countries such as Sweden, Norway, and the United States, seeing that a large quantity of their paper is made from wood pulp, it would seem natural that the countries which produce the raw material should also supply the finished article. Upon this the Paper Maker's Monthly Journal comments:

It is not for us to point out to other nations that it is more natural for them to do a portion of the work we do at present, and hand it over to them accordingly. Are we to abandon those manufactures the raw material of which is produced in other countries, and inform the people of those countries that we think it would be more natural that they should supply the finished article instead

of ourselves? We do not act in such a manner with our fellow competitors in business. If we did so, we should soon have no business left. The question of Protection or Free Trade is one of principle. Which is the principle that enables us to retain the greatest share of the world's trade? Whichever is the best we must adopt, whether it be Free Trade, Protection, or a modification of either. In the case of the paper trade, we have thought it advisable to refresh the memory of our readers with a resumé of the growth of the paper-making industry in this country as stimulated by the introduction and perfection of the paper-making machine, nurtured and developed by British patience and capital. This will serve to show how after being the pioneers in the improvement of this industry, at the beginning of the last century, having previously obtained our best supplies from Italy, France, Holland and Belgium, through not sufficiently safeguarding the interests of our own manufacturers, we have instructed other countries in the improved art of paper-making, by selling to them our machines, which we might safely have done, so long as the extra duty was imposed on foreign paper, to prevent the foreigner coming into competition with the home manufacturer. But after continuing this extra duty for a long period of years to protect our own makers, our policy was suddenly reversed, and the foreigner having obtained our machines and become fully instructed in our methods, was then freely admitted to compete with our own paper makers, with the result that a large portion of the British paper trade and its profits has fallen into the hands of foreign manufacturers.

It was early in the 16th century that a manufacturer named Tate had a paper mill at Hertford; and another mill was established in 1588, at Dartford, in Kent, by John Spelman, who was knighted by Queen Elizabeth. Previously to this, and for some time afterwards, our principal supplies were from France and Holland. The making of paper in England had made little progress even so late as 1662. It is stated that Fuller wrote the following remarks respecting the paper of his time: "Paper participates in some sort of the character of the country which makes it; the Venetian being neat, subtle, and court-like; the French, light, slight and slender; and the Dutch, thick, corpulent and gross, sucking up the ink with the sponginess thereof." He complains that the making of paper was not sufficiently encouraged, "considering the vast sums of money expended in our land for paper out of Italy, France and Germany, which might be lessened were it made in our nation."

It was in 1713 that one Thomas Watson, a stationer, by the introduction of foreign improvements, gave a great impulse to the manufacture of paper. Still, notwithstanding the great increase of demand and the application of capital, it was much retarded by a heavy excise duty. So late as the middle of the last century, only very common paper, principally for wrapping, was made in Great Britain. It was not until 1770 that the celebrated Whatman introduced fine paper making at his mill at Maidstone.

Just at the close of the last century, M. Robert, a workman in the employ of M. Francois Didot, at a paper mill at Essones in France, invented a machine for making continuous paper; Didot set the apparatus to work; and in 1799 Robert obtained 8,000 francs from the Government, and a patent for fifteen years. In 1801 Didot came over to England, accompanied by John Gamble, who had resided some time in France. After sundry negotiations, and the obtaining of two English patents, these patents were sold to Messrs. Fourdrinier. It was at Messrs. Hall's establishment, at Dartford, in Kent, that the construction of the machines was carried on under the special supervision of Bryan Donkin. It was in 1802 that the model of the first self-acting machine was set up at Frogmore, in Hertfordshire; and in 1804 that the system came successfully into work at a paper mill at Two Waters. Since that year a succession of beautiful additions and improvements have been made; although it is only just to mention that the main principles

of the machine have all along remained nearly the same. Bryan, Donkin & Co. devoted such special attention to this subject that they were then the chief makers of the machines; in the first ten years they set up thirteen paper machines; in the next ten, twenty-five; by the year 1851 they had set up 191, and subsequently the number steadily increased. So far from these having all been intended for home use, more than half were made for foreign manufacturers; Germany being the best customer on the Continent of Europe.

Until 1837, the duty on paper was charged in two classes. That made wholly out of old tarred rope, without extracting the pitch or tar, was considered as second-class paper, and paid only a duty of 1½d. per lb., while paper made of any other material was considered as first-class paper, and was charged with a duty of 3d. per lb. In the year above mentioned this distinction was abolished, and the duty on all kinds of paper was fixed at 1½d. per lb., which gave an immediate impulse to the trade. The effect of this change in augmenting the quantity used was soon shown. In round numbers the quantity made in 1835 and 1836 averaged 78,000,000 lbs. (34,821 tons) per year, whereas in 1837 and 1838 it averaged 91 million lbs. (40,625 tons). Foreign paper had not hitherto competed largely with home-made because a customs duty had interfered with it. In 1857 and the two following years the quantity of paper made in the United Kingdom was as follows:

1857	198,000,000 lbs.	(88,392 tons).
1858	193,000,000 lbs.	(86,160 tons).
1859	218,000,000 lbs.	(97,321 tons).
		271,873 tons.

Of the total production for the three years, as given above, it is estimated that about 22,656 tons were exported and 249,216 tons used at home.

The average quantity of paper made at each mill may be inferred from the following table for the year 1859:

	No. of Paper Mills, 1859	No. of Paper Mills at Work, 1859.
England	694	333
Scotland	79	54
Ireland	70	27
	843	414

The principal counties in England for the manufacture in the year 1859 were Kent, Hertfordshire, Lancaster, and Devonshire. In Scotland, the chief paper making counties were Lanark, Midlothian and Aberdeen.

The number of paper mills in Great Britain in the year 1859 was larger than at the present time. The elimination of the small mills and the introduction of efficient machinery to economize and increase the output has placed the trade in the hands of a smaller number of firms than formerly. It was in 1860 that Mr. Gladstone, as Chancellor of the Exchequer, reduced the customs duty on foreign paper of 2½d. per lb. with 5 per cent. additional to 1½d. per lb. with 5 per cent. additional, making it equal to the excise duty on home manufactured paper, which placed the foreign paper maker on an equality with the home manufacturer, and led to the first unimpeded rush of foreign manufactured paper into this country. The immediate results of this policy will be seen from the following figures given below, and its ultimate effect has been the continued increase of importations of foreign manufactured paper, to the benefit of the foreign paper manufacturer, and to the loss of the British paper maker until the present time.

Imports of foreign manufactured paper into Great Britain from 1861 to 1872:

	Quantity, Cwts.	Estimated Value.
1861	61,705	£156,000
1862	115,927	294,000
1864	153,034	392,840
1866	159,008	408,121
1868	177,220	454,865
1870	173,616	445,613
1872	203,742	578,833

COTTON RAG PAPERS.

The specific tendency of the cotton fibre, especially in the unsized state, to roll and curl up so as to form clots is well known. "M.," writing in the Papier Zeitung, says these clots are not, however, "knots" in the true sense of the word, and they are easily disintegrated by gentle agitation, such as pouring pulp from one vessel to another. The rolling up of the fibres is caused on the one hand by the friction of the arms of the agitator on the pulp, but, on the other hand, in a far greater degree, by the friction of the pulp against the sides and bottom of the stuff chest. The trouble will be greater the rougher the internal surface of the chest, and it can be obviated to a large extent by lining the stuff chest with glazed tiles. The fibres will then tend to slide over the glazed surface, instead of rolling. Reducing the speed of the agitator and discharging the pulp into the chest simultaneously with a large volume of water will reduce the evil, but will not prevent it entirely. The ease with which the clots are disintegrated in the presence of water enables them to be disposed of in the knotter. If the knotter be adjusted so as to give the greatest possible, vertical motion, i.e., to work with a heavy "jog," the beating action of the knotter plates on the pulp will completely unroll the clotted bundles of fibres. It is true that a violent action of the knotter permits a few of the true knots, i.e., unreduced particles of rag and thread in the pulp, to pass through into the paper, but a pulp which has been carefully and thoroughly prepared in the beater ought not to contain a serious proportion of such knots.

HARD WATERS IN SIZING.

It being an incontestable fact that the earthy resinates tend to render writing paper impermeable to ink, the best authorities agree that the formation of these compounds should be avoided by employing only the softest waters which can be obtained. I have, however, been somewhat at a loss to explain why difficulties in sizing occur more frequently in paper mills situate on the slopes of the Alps, and which use waters less rich in lime and magnesium salts than other mills using selenitic waters. In two cases which I had occasion to study, the permeability of the paper manifested itself more particularly in the summer and autumn, as well as in the rainy season. During these periods the hardness of the waters fluctuates largely, falling sometimes to a minimum of 3 to 7 deg. This was due not only to the purity of the waters, but also to the elimination of earthy salts, produced from the products of the disintegration of felspathic rocks.

The technical staff in these mills not being aware of these fluctuations, and not knowing how to account for the effects caused by the variations in the amount of earthy bases contained in the water, could not understand why the anomalies which they complained of were produced, seeing that they were using the same raw materials, and that there was no variation in the sizing process. On examining, by means of color reagents, these papers, which were found to be permeable to ink, it was discovered that their acidity was higher than usual, and it did not take long to find that when written on with inks consisting of a lake of hæmatoxylin and oxide of chromium dissolved in oxalic or hydrochloric acid, inks which are in common use, the slightest variations in the acidity of the paper manifested themselves with extreme sensitiveness by their action on the excellence of the sizing.

The greatest difficulties observable in passing from hard to soft waters may perhaps be explained by the fact that where waters are employed which contain calcium and magnesium salts, these latter replace the aluminum sulphate by decomposing an equivalent quantity of the rosin size, and so causing the fixation of the earthy soaps. These are unaffected by cold, but are capable under the influence of heat of reacting upon the aluminum sulphate interspersed among the vegetable fibres, producing either double decomposition or neutralizing the sulphuric acid, which tends to become set free owing to the well-known dissociation which this salt

undergoes when the paper is dried on steam-heated drying cylinders.

In investigating these reactions it is necessary to remember that the composition of the precipitate formed when alkalies or alkali or earth alkali carbonates are added to a solution of aluminum sulphate in the cold, varies according to the temperature at which the reaction is carried out. According to the recent researches of O. Sehmatolla, the ratio between the alumina and the sulphuric acid is as follows:

1. Al_2O_3: (SO_3), when the calcium sulphate reacts in the cold.

2. Al^2O_3: 1-12 (SO_3), when the calcium sulphate reacts at boiling heat.

3. Al_2O_3: 1-6 (SO_3), when making the calcium sulphate react by precipitation in the cold with alkalies till an alkaline reaction is produced.

4. Al_2O_3: 1-24 (SO_3), when the calcium sulphate reacts at boiling heat.

From the moment in which the aqueous solution of the rosin size tends to decompose and liberate the alkali, it is obvious that the aluminum salts cannot behave otherwise than as above indicated, and that the alumina must to a great extent be present in the pulp as the sub-sulphate. As a matter of fact, the precipitate formed when the rosin size is caused to act upon the aluminum salts in a cold and dilute solution, as is the case in vegetable sizing, contains appreciable quantities of sulphuric acid, even after prolonged washing with water. It will thus be seen that the corresponding acidity set up in the paper remains invariable, even after drying, and may be excessive in the absence of earthy resinates, and if the water employed does not contain earthy bicarbonates which act as alkaline reagents as the water flows over the machine.

The influence exercised by these variations in the degree of hardness of the waters employed for sizing seems to me to be sufficiently proved by the acidity which the paper acquires according to whether the sizing is carried out with the help of pure or selenitic waters. After sizing the pulp under precisely equal conditions, and determining the total acidity of the paper volumetrically, I have found on disintegrating the samples in boiling water, that the results vary as follows: i.e., assigning the value of 100 to the acidity of a paper sized with a selenitic water containing 2 grammes of $CaSO_4$ per litre, the acidity varied with pure water between 141 and 169, according to the excess of aluminum sulphate employed and the volume of water present. These differences occur in the reverse direction in the waters employed for sizing, which leads us to the conclusion that the use of pure water ensures a better fixing of the aluminum sulphate, since this latter contains a large proportion of sodium sulphate with which it is capable of undergoing double decomposition.

If the rosin size is partially converted into earthy soaps, which only react feebly in the cold, these become lost in waters containing large quantities of aluminum salts. Where the causes rendering the succes of the sizing uncertain are known, it is not difficult to find a remedy, it being sufficient to regulate the proportion of aluminum sulphate and the alkalinity of the size so as to keep the final acidity of the paper within narrow limits, which may be done most efficaciously by sizing in two stages, adding part of the aluminum sulphate before the size, and the remainder afterward. Admitting the imperfect knowledge which we possess at the present time of the phenomena concerned in the operation of sizing, it cannot be denied that there are factors other than those above mentioned, which render difficult or favor the fixing of the sub-sulphate of aluminum or alter its relations with the other constituents.

A vigorous research into this important problem has recently been undertaken in the Milan paper research laboratories, which I hope may be a complete solution of it. At the present time it seems to me that the preliminary experiences, above described, prove that the difficulties encountered when the hardness of the waters varies are due to an effect exercised by the earthy resinates which prevent a subsequent excess of the sub-sulphate of aluminum, but require an attentive control as they lessen the complementary quantity of alumina fixed. Without disputing

as to whether it is preferable to use pure water for sizing, it would seem that the quantity of rosin which enters at first into combination with the lime and magnesium is not waster, since a portion of the rosin is set free.—Professor Gianoli, in Rivista Tecnica.

DIMENSIONS OF BEATING ENGINES.

A good hollander, or beating engine, should, says a writer in Papier Zeitung, require the smallest possible expenditure of power to drive, and in the first place as little as possible of the roll should be immersed in the stuff, all sharp bends and corners should be avoided, and on the front or roll side of the backfall the stuff should stand at as low a level as possible in contrast to that on the further side. For these reasons the roll should not be placed in the middle of the hollander, but there should be more room in front of the roll than on the further side. The proportion is advantageously taken as 4 : 5. Further, the midfeather must reach nearer the side of the vessel beyond the roll than on the side of the roll. With moderate sized hollanders these distances between the ends of the midfeather and the sides should be taken in the proportion of 3 : 5. By this means the contents will stand higher beyond the roll than in front of it, and thus the roll will be immersed to a lesser extent. That circulation of the material may be kept up, there should be a gradual slope in the bed of the hollander from behind the roll, round the vessel, to the front of the roll. A suitable gradient is 1 in 40 for most machines. Again, the midfeather must be nearer one side of the hollander than the other; the channel in which the roll lies should be wider than the empty one on the other side in the proportion of 100 : 75.

These rules are frequently broken, and it is common to meet with hollanders with the midfeather exactly centred, both laterally and longitudinally, so that the channels on either side are of equal width and the ends of the midfeather equidistant from the ends of the vessel. Many people think that a machine is the more effective the larger the number of fixed knives in the bed plate. Yet experience teaches that it is useless to increase the breadth beyond a certain point, when, on the contrary, more power will be required without producing any further effect. The breadth should not exceed 10 to 12 inches. The machine is advantageously fitted with two rolls, one stone and the other with steel or bronze bars. In this way it is possible to produce stuff at any particular stage and beaten wet or free as desired. The stone rolls are most useful, especially for the production of wet beaten stuff, and the writer enlarges on the necessity of this in order to attain the high figures for strength demanded for so many varieties of paper.

—A correspondent of the World's Paper Trade Review, writing from Sydney, says that the experience of Australian users of news (roll) paper is that in a reel which runs out about 8,000 four-page papers there is a difference of 500 to 750 copies in favor of the Swedish over the American paper. It may be claimed that the American is a trifle heavier and of better finish, but even that claim is open to argument; certainly it is not near as tough as the Swedish product, and the spoils on a machine where the tension is a trifle erratic also amount up to thousands of copies during the week in favor of the Swedish paper.

—In a report of the industrial development of Italy, A. Percy Bennett, commercial attache to the British Embassy at Rome, briefly refers to the paper industry. It appears that the average yearly production of paper exceeds 95,000 tons. The number of paper and wood pulp factories is 424, giving employment to 16,000 hands. The total motive force is 26,204-h.p., including 2,089-h.p. steam, 18,900-h.p. hydraulic, and 1,075-h.p. electric. The advance made in the paper industry has led to an increased importation of wood pulp. The export of both writing and wrapping paper is said to be rapidly increasing.

THE BLEACHING OF WOOD PULP.

By R. W. Sindall, F.C.S., and F. Heckford, in World's Paper Trade Review.

(Continued from last issue.)

Although we have emphasized the fact that laboratory trials made under definite conditions are indispensable to efficient and economical treatment in the mill on the large scale, and that such trials in the hands of an intelligent operator are of great value for daily application, yet there are certain interesting exceptions. With one of these we shall deal in the present article.

During the course of some investigations as to the possibility of modifying the methods of bleaching, we studied the effect of washing the pulp with water before actually bleaching it, so as to determine the influence of any soluble constituents upon the rate of bleach consumption, and the color of the final product. The laboratory trials indicated that in some cases such a process might be adopted with advantage in the mill. Thus a preliminary washing with water, generally speaking, causes a more rapid consumption of the bleach, with a production of a much better color, as compared with the ordinary method.

In one trial a pulp consumed 12.5 per cent. of bleach when first extracted with water in three hours. Under ordinary conditions this pulp only consumed 11 per cent., but there was no comparison of color, the former being infinitely better. In another case with three hours' bleaching a pulp, after a preliminary extraction with water, gave a very good color, consuming 7.5 per cent. bleach, and only a moderate color consuming 6 per cent. of bleach in the ordinary way. It is to be noted that the further consumption of 1.5 per cent. in the latter instance did not bring up the color equal to the former. Here in these particular instances the removal of some soluble matters from the wood pulp has improved the final bleaching effect.

It would appear reasonable to suppose that the operations conducted on a large scale would give similar results. Such is not the case, however, for, in the mill, the element of "bulk" enters largely into the question. It is true that with the laboratory trials one may readily use the pulp and bleaching solutions in the proportions which obtain in the mill, but certain effects are produced with operations on the large scale, which escape the attention of the operator working on a small scale. Thus in the washing of pulp in large quantities, resinous matters are mechanically liberated and gradually accumulate in the form of sticky tenacious masses which give endless trouble. The appearance of resinous matter of this description on the sides of beating engines has long been known, and its accumulation is greatly aggravated during a process which at first sight seems likely to give beneficial results.

The element of "bulk," to which we have referred, is an important factor in many chemical operations. For example, with certain chemical reactions it is necessary to conduct the operations at a low temperature, not allowing the solutions to get heated. On a small scale it is comparatively easy to keep the temperature down, but in working with large bulks and quantities, the reduction of temperature is not so easy, as large quantities of solution cannot be cooled very quickly. While there is no parallel between this example and the washing of wood pulp, it seems to show that the influence of bulk is one which cannot always be allowed for in the laboratory.

The influence of the soluble constituents upon the consumption of bleach and the ultimate color may easily be studied by determining the bleach required after removal of some of these bodies. We append a table showing the results obtained with two brands of pulp. In one case we extracted the pulps with water and ether before bleaching, with the result that the percentage of bleach consumed by brand D was greatly reduced, and the color improved.

Mill Matters

Work is progressing rapidly on J. R. Booth's paper mill. The walls are now up to the third story.

Satisfactory progress is being made by the Spanish River Pulp and Paper Co. in the construction of their dam, which is the only part of the equipment still incomplete.

It is reported from Sault Ste. Marie, Mich., that Francis H. Clergue and other capitalists, some of whom are residents of Detroit, are planning to erect one of the biggest paper mills in the country a few miles below that city.

The Sault Ste. Marie Pulp and Paper Company, of Sault Ste. Marie, Ont., will shortly commence the manufacture of tarred paper, such as is used for building purposes. The machinery for this work has been ordered, and it is expected the new plant will be ready for operation this month.

It is reported that the Chatham pulp mill at Chatham, N.B., has been sold to the Nashua River Paper Co., of East Pepperell, Mass. The mill will be operated to its full capacity and the product used at the Pepperell mill. Mr. Beveridge, of the Cushing Sulphite Fibre Co., is said to have negotiated the sale. The price paid was $250,000.

The St. Lawrence River Power Co., of Massena, N.Y., is taking measures to deflect floating ice at the canal intake by means of booms made out of heavy timber, which will extend about four feet into the water. Ice has been a great hindrance to this company and others in the neighbourhood in the past, and the experiment will be watched with great interest.

The Sandusky Foundry and Machine Co., of Sandusky, Ohio, are issuing an illustrated catalogue of pumping machinery, in which is described their multiple cylinder pumps, double cylinder and duplex double cylinder pumps, variable stroke pumps, single and double acting, triplex stuff pumps, patent shower pipes and pipe and well tools. The Waterous Engine Works Co., of Brantford, Ont., are manufacturers of these pumps for the Canadian market.

Property owners of Merritton, Ont., have passed a by-law, by a large majority, which exempts the Lincoln Paper Mills Company from taxation for ten years. This company has taken over the property known as the Lybster Cotton Mills, and will expend thereon the sum of $250,000 in converting it into an extensive paper factory.

The Cornwall Paper Manufacturing Co. has started its mill at Mille Roches. Mill wrapper was made for some time to get the machine in operation, and now the mill is turning out its permanent product, namely, writing. The machine, which was made by Bentley & Jackson, of Bury, Eng., was described in a recent number of this magazine.

Mr. Colby, the hydraulic engineer of Boston, has investigated the water-powers of the Quatsino Pulp and Paper Co. in British Columbia, and reports that there is about 14,000 horse-power available. This will be sufficient for the company to operate on the large scale intended. Plans for the pulp mill are complete, and those for the paper mill are being prepared.

There is rumor of another coating mill in Canada. It is reported that an English syndicate is negotiating for the patent rights of an American inventor of a double coating machine for the purpose of installing the machines in connection with a paper mill which it is said the owners have been anxious for some time to sell. Should the project go through, the company will make coated paper for the English market.

A new and larger wood-room is under construction at the Imperial Paper Mills, Sturgeon Falls, to replace the one destroyed in the recent fire. The boiler-room is also being extended to accommodate a new boiler which is being installed. Logs are being taken from the water and piled in the yard at the rate of about 4,500 logs per day, which is a record for a single jackladder. Recently 6,560 logs were taken out and piled in a single day.

Forestry and Pulpwood

A course of lectures in farm forestry will be delivered by Dr. Clark to the Farmers' Institute speakers, when they assemble in Toronto next month.

The administration of Ontario's provincial parks has been removed from the Bureau of Mines to Mr. Southworth's section, which is now known as the Bureau of Forestry, Colonization and Parks, and there has been added to the staff of that bureau, George Yates, formerly private secretary to Hon. E. J. Davis. By the new arrangement it is thought that the management of our parks and forests will be more expeditiously and conveniently handled.

The town and environs of Orsa, in Sweden, has in the course of a generation sold £1,150,000 worth of trees, and by means of judicious replanting has provided for a similar income every thirty or forty years. In consequence of the development of this commercial wealth there are no taxes. Railways and telephones are free, and so are the school-houses, teaching, and many other things. This is a remarkable object lesson on the value of systematic forestry.

The Board of Directors of the Canadian Forestry Association recently passed a resolution expressing the opinion that in view of the annual destruction of timber in British Columbia and the difficulty of guarding the forests from fire, it is desirable that the Bush Fires' Act of that province should be amended so as to prohibit the starting of fires for the clearing of land between the first day of May and the first day of November in each year unless a special permit for that purpose be granted by the forest ranger or other officer appointed for the district in which such permission is asked.

A large purchase of spruce land in New Brunswick was recently made by the Bay Shore Lumber Co., a new company incorporated in Maine with $500,000 capital. The new company is made up of men interested in the Bowdoin Paper Manufacturing Co. and the Pejepscot Paper Co., so that these two companies are assured a supply of pulpwood. The president of the Bay Shore Lumber Co. is David S. Cowles, president of the Pejepscot Co.; the treasurer is F. C. Whitehouse, vice-president of the Bowdoin Co., and treasurer of the Pejepscot Co.; while the secretary is W. W. Nearing, secretary-treasurer of the Bowdoin Co., and secretary of the Pejepscot Co. President Cowles is also associated with W. H. Parsons & Co., of Montreal.

Peter McKenzie, head of the McKenzie Trading Co., recently returned from an extended trip to the country in northern Quebec, between Lake St. John and James Bay. He reports great mineral wealth—in iron and asbestus particularly—and almost unlimited pulpwood supplies. In speaking of his trip north, Mr. McKenzie said: "I think that northern Quebec is most rich in lumber, agricultural lands, water power and fish, and I would like to see that country opened up and developed immediately. I would like to suggest that the local Government give a subsidy sufficiently large to build a railway that would encourage prospectors and settlers to open up and settle. It is, indeed, one of the finest portions of land in the entire Dominion, and Canadians who have not visited that district have no idea of its dimensions and possibilities."

PRINTING AND PUBLISHING NOTES.

The Assiniboia Church Advocate is a new 16-page monthly in the interests of the Moose Jaw and Soo Line district of the Assiniboia Methodist Conference. Rev. T. E. Holling, B.A., is editor.

The headquarters of the Canadian Horticulturist are to be moved from Hamilton to Toronto, and the paper is to be placed under one management with a new dairy paper. The Dairymen's Association of western and eastern Ontario have declared in favor of having a paper of their own. A company is being formed to take charge of the fruitmen's paper, and a joint stock company will control the dairymen's paper. The arrangements are being

made under the approval of the Department of Agriculture.

PERSONAL.

Henry Smith, an employee of the Montrose Paper Company, Thorold, was caught on a shaft of one of the machines in the mill on the 16th inst., and died from his injuries about two hours afterwards. He leaves a widow and seven small children.

Capt. James E. Partlane, of Liverpool, recently visited Three Rivers and Montreal, in the interests of an English syndicate that desires to cut pulpwood in Quebec. He expressed confidence in the ability of Canada to keep British mills supplied with the raw material for paper-making.

Charles W. Rantoul, Jr., formerly with the Imperial Paper Mills, Sturgeon Falls, has opened an office at 41 Park Row, New York City, under the name of the C. W. Rantoul Company, Inc. The company will act as a selling agency for paper mills.

Patrick Byrne, formerly superintendent for the Canada Paper Co., is now with the Riordon Paper Mills at Merritton in the same capacity.

MAP MOUNTING.

Maps or plans that are worth printing or drawing should be worth preserving, and cannot be so kept unless they are properly mounted. There are many ways of doing this, namely, mounted to hang on the wall neatly, either varnished or unvarnished or on spring rollers to place in a cabinet, or for dissecting and folding to carry in the pocket or file away in a bookshelf. This work can only be done by experienced workmen, and our readers will no doubt be pleased to know that the Steinberger-Hendry Co., Toronto, whose card appears in our advertising columns, make map mounting their special business. They will give estimates on any work of this kind. They also carry in stock maps and atlases of every description and invite correspondence.

USES OF PAPER IN GERMANY AND RUSSIA.

In the rebuilding of the King of Corea's palace, which was recently destroyed by fire, papier maché will be solely employed. To obtain a sufficient quantity for the purpose there has been engaged a staff of 1,000 Coreans, possessed of strong teeth, for chewing up paper.

At Savinoroska, in Russia, is a paper house. It has been entirely built of blocks of papier maché, even the foundations and roof being made from that material. So, too, are the chimneys, although the paper used in their construction was first mingled with a fireproof material. The house, which is of considerable extent, will, in the opinion of its architect, outlast such as are built of stone and brick. It cost over £8,000.

In certain towns of Russia the experiment is now being made of utilizing paper for paving the roads and streets. In this case also blocks compressed to great solidity are employed, and are said to stand excellently the wear and tear of traffic. The cost, however, is at present too great to permit of anything like their universal adoption. For courtyards of mansions and similar purposes where expense need not be of much consideration, paper pavement, it is averred, will soon come into vogue.

Out of the sheets of an Austrian daily paper an ingenious Viennese engineer has lately constructed for his own use a small yacht, fifteen feet long, decked all over, and provided with a centreboard. In the making of the hull, deck, masts, sails and rudder several thousand copies of the journal were used—each plank requiring no fewer than 2,500 leaves—and enormous pressure had to be employed before the necessary solidity could be obtained. The inventor has already made several excursions on the Woerth Sea, and even in squally weather his boat is said to have behaved admirably.

The late Henry Krupp completed, a few months before his death, a number

of paper field pieces. These unique guns, which were made to the order of the German Government, are intended for the exclusive use of the infantry. Their calibre is very small, being, indeed, less than two inches, and so light are they that a single soldier can, unaided, shoulder one with ease. Despite their small weight, however, the resistance is greater than that of a steel field piece of the same calibre.

Germany, too, can boast itself the pioneer in a dental novelty, viz., in paper teeth, which are constructed from paper pulp instead of from the porcelain or other material usually employed. They are said to have given satisfaction to such as have ventured on their use, for not only do they keep their color well, but, not being brittle, are much less liable to chip than the ordinary false teeth. They are likewise guaranteed to be very durable.—London Tit Bits.

ELECTROLYSIS.

The electrolytic manufacture of chlorine and alkali is making much progress, and promises to develop so much further in the future, that an account of the present position of the industry, and of recent improvements, is of interest. There are already a number of different electrolytic methods that are worked upon a commercial scale, and which differ one from the other, not only in principle, but in most of the details.

These are reviewed by Albert Neuburger in the Zeitschrift fur angewandte Chemie. Of the methods in which use is made of a porous diaphragm, the anthor observes that the process of Hargreaves and Bird is undoubtedly the most important, and all others in this class are more or less founded upon it. The Electrolytic Alkali Co. are now working the Hargreaves-Bird process on a large scale, at Middlewich, where they pump their own brine and have a plant which comprises 150 electrolytic cells.

Of the processes which depend upon the use of mercury to form an amalgam with the sodium, which is afterwards decomposed with water in a separate compartment, the Castner-Kellner is the most important. Like the Hargreaves-Bird process, it may be taken as being typical of a whole class.

The variations consist mostly in differences in the mechanism by which the decomposition of the sodium amalgam is carried out. Recently the "bell" process has acquired considerable favor; although it has only existed a comparatively short time, it is already being worked in one factory in Austria and three in Germany, and the development would no doubt have been greater were it not that the conditions have been unfavorable, the over-production of chloride of lime rendering the industry somewhat unremunerative.

—An important discovery of china clay has been made at Coedpoeth, near Wrexham. The clay is said to be the best china clay in North Wales. A company is to be formed to work the clay, and the Great Central and London and North-Western Railways have been asked to extend their systems to Coedpoeth.

—Two judgments summarily recovered by the Bank of New Brunswick against the Montrose Paper Company, of St. Catharines, for $540 and $556 on two promissory notes, have been set aside by the Divisional Court, and the cases ordered to go to trial in the regular way.

The wife of a well known New York paper dealer has discovered a new use for parchment paper. It has been proved that poultry for roasting can be placed in the oven wrapped in parchment paper. By this process all the juices are retained, which does away with the necessity of basting, which has heretofore required much of the time of the person doing the cooking. The poultry is left in the paper until the flesh is almost done, when the paper is removed and the roasting—or browning—completed.

TABLE IV.

Showing effects on bleach consumption and color after a preliminary extraction of pulp, with water, etc.

PULP BLEACHED FOR THREE HOURS AT 65-70 DEGS. FAH.

Conditions	Brand D.		Brand E.	
	% Bleach consumed	Color	% Bleach consumed	Color
(1.) Pulp bleached in ordinary way in shallow dish....	10.8	Moderate	6.9	Fair
(2.) Pulp bleached in ordinary way in bottle.....	10.8	"	6.7	"
(3.) Pulp bleached after first extracted with water..	12.5	Fair	7.5	Good
(4.) Pulp bleached after extraction with water, then ether	7.6	Good	7.5	Very good

The great variation in the composition and quality of the wood pulps offered makes a thorough investigation of the whole subject a matter of the utmost importance. The pulp manufacturer raises the quality of his product by boiling the wood for a greater length of time, or by the use of a stronger liquor. The precise effects of these altered conditions in terms of the chemical constitution of the wood pulp obtained are not known, although the practical results in the shape of an "easy bleaching" pulp are.

It might be asked by the practical papermaker: "What object would be gained if we did know?" The answer to such a question is that any knowledge of constitution gained in this direction would enable the pulp maker to modify the conditions of treatment to suit given requirements.

Thus we have an easy bleaching pulp on the one hand characterized chiefly by its soft handle and lack of hardness. On the other hand we get a hard, strong pulp of a totally different character, which cannot be described as an "easy bleaching" pulp.

Investigations which might lead to the manufacture of a pulp possessing both qualifications must be of the greatest value.

(To be continued.)

METHOD OF MAKING PAPER MOISTURE- OR GREASE-PROOF.

Improvements in methods of making paper water-and grease-proof have been invented by Isidor Kitsee, of Philadelphia. The improvements are described by the inventor as follows:

"Cases often arise where it is preferred to employ paper proof against moisture or grease. I refer here only to paper bags which enclose meats for shipment and where it is desired that the meat should be protected entirely from outside influence and the grease and moisture of same shall not penetrate the bag; but besides this, different occasions have arisen where paper should be substituted for other material, provided the same can be made in a cheap and economical way proof against moisture and grease. To produce such paper is the aim of my invention.

"It is well known that if a fibrous material is subjected to the process of nitration—is immersed in a liquid containing nitric acid or any other nitrate—the material loses its cellulose construction and assumes a state wherein it is easily dissolved in an alcohol-ether, acetone, amyl acetate, or acetic aid; but in this state the material becomes entirely amorphous and forms a jelly-like substance with the solvent.

"In technic the nitrated material is mostly called soluble cellulose and the material dissolved is called dissolved cellulose. These operations are old in the art and are well understood by persons specially versed in the art of making celluloid, celluloidine, and other like compounds. In carrying out my invention, I make use of this property of the fibrous material to become soluble through the process of nitration; but it is a sine qua non with my invention that the process shall not be carried out in its entirety, but should be stopped as soon as the surface has become nitrated enough to be slightly soluble in

one or the other of the above mentioned solvents. Whereas, therefore, in all processes of nitration, it is the aim to produce a thoroughly nitrated article, one which readily dissolves in its entirety in the solvents above mentioned, it is the aim of this my invention that the paper as such should not lose any of its strength due to its fibrous condition, but that its surface alone should have changed its structure so as to be enabled to become a soluble cellulose through the application of one of the solvents.

"The usual liquid for nitrating fibrous material consists of one part of nitric acid to two parts of sulphuric acid by measure, and, as said above, the fibrous material has to be kept in this liquid until it becomes entirely soluble. In this, my invention, I rather prefer that the liquor should consist of one part of nitric acid and three parts of sulphuric acid, for the reason that the sulphuric acid imparts to the paper a greater strength, as is well known in the process of parchmenting paper. In my experiments, which mostly had for their purpose to produce a paper useful for wrapping or packing, I allowed heavy wrapping paper made of wood and straw to remain in this liquid (temperature about 60 deg.) only for from one and a half to two minutes. This paper was then washed in a liquid containing ammonia or sometimes containing carbonate of soda and after drying subjected for one minute to the action of one of the above mentioned solvents.

"I found that it is not well to use for this my invention either alcohol-ether or acetone, but that amyl acetate, and specially acetic acid, are to be preferred, and I, to the exclusion of all others, now use the same. The product is rather tougher than the paper before undergoing the process, and that only the surface is made slightly soluble can be seen therefrom that the surface itself has assumed a brownish hue due to nitrating, whereas the inner part of the paper has retained its former grayish-white appearance. I do not claim here that the nitrating of paper, as such, is old, and my claims are limited so as to include only the partial nitration of paper whereby the same is made waterproof and greaseproof without losing the peculiar structure and toughness it originally possessed.

"Out of the product packing bags may then be produced, and these bags will not allow the moisture or grease to penetrate; but to produce these bags it is not necessary to use any foreign substance, such as the usual paste, for the purpose of pasting together the edges so as to form a receptacle, for the reason that the surface is, before drying, sticky enough to perform this function, and it is my purpose to produce these bags out of the paper treated in the manner as described before the surface is dried and is sufficiently moist to hold together. This part of my invention will be more clearly set forth in a separate application.

"I have not in this specification stated that the paper, after being made waterproof, can be carried through rollers for the purpose of smoothing the same and for the further purpose of compressing the moist surface, as the process of carrying papers through rollers, heated or otherwise, is well known by persons versed in the art of paper making."

SIZING SUBSTANCES.

Dott. Camillo Levi recently read a paper at the meeting of the Societa Chemica di Milano, Italy, the subject being: "Some Sizing Substances and Their Use in the Manufacture of Paper." L'Industria gives the following synopsis of his remarks, as well as opinions of its own, that will be found of value to our paper makers.

Casein, he said, was suitable for use in mills turning out coated paper. He referred to the experiments already made in the laboratory by Dott. Lamberti with Milan paper, and observed that it was impossible to express any definite opinion from the samples analyzed. He therefore repeated the experiments in the paper works of A. Binda & Co., with paper pulp sized with casein alone, a mixture of rosin and casein and pure rosin. Results were not as expected, as considerable quantities of casein were requisite to attain satisfactory sizing, and opposed to ac-

counts previously published. The proportion of mineral filling retained by the fibre was not greater than that left in paper sized with rosin.

Although casein gives paper greater whiteness and the required gloss more easily and with less pressure on the calender rolls, Dr. Levi does not consider its use recommendable, especially owing to its cost, and is of opinion that his experiments are conclusive in the question of practical use of casein for sizing pulp.

Results obtained in sizing paper sheets were, on the contrary, promising. All the samples coated with casein were much whiter than paper sized with gelatine. The degree of sizing was not the maximum, but was greater than that obtained with gelatine. Mechanical properties were weak, though but slightly so, and resistance to crushing equal in all the samples examined.

The rupture length of unsized paper was 2,777 meters and elongation 3.85 per cent.; the same paper sized with gelatine, 4,995 meters and 5.08 per cent.; finally, sized with casein, 4,612 meters and 5.27 per cent. In another variety of paper the rupture length for unsized sheets was 2,556 meters and elongation 4.18 per cent.; sized with gelatine, 5,215 and 5.25 per cent.; with casein, 4,664 and 5.20 per cent. The slight difference in rupture length may be eliminated, according to the experiments, when certain precautions are taken, especially with regard to drying, it being noted that sized paper is more resisting according to the greater slowness of drying.

To prevent casein solutions from decomposing in summer and paper kept in humid places from emitting unpleasant odors, Dott. Levi adds 2 to 3 per cent. of formic aldehyde to the dry casein.

Casein sized paper was found satisfactory to touch and less vitreous than the made with gelatine, and there were no bright spots, such as those sometimes found on paper treated with animal size. The greatest inconvenience met with in these experiments was the difficulty in detaching the sized and pressed sheets. Casein solutions thicken much more rapidly than gelatine, so that it is requisite to work more rapidly to avoid a fall of temperature.

The two felts employed in gelatine sizing are not sufficient with casein owing to gliding of the sheets in the press. By inserting a felt saturated with a hot solution of casein, after each tenth sheet, gliding is prevented, and at the same time removal of the pressed sheets facilitated.

For good sizing, especially hand, about 14 grammes of casein are needed per 100 of paper, viz., about the same as in the case of gelatine, so that cost is not more than usual.

Amongst the solvents for casein, viz., the borate, carbonate, silicate of soda and ammonia, Dott. Levi prefers the latter, because in drying it evaporates, thus facilitating insolubilization. Addition of boric acid is advisable, as it acts as an antiseptic, and gives fluidity to the solution.

Another material examined by the experimenter was viscose, recommended by Messrs. Cross and Bevan. As is known, the aqueous solution of cellulose in the state of sulpho-carbonate has the property of decomposing spontaneously into its component parts, i.e., regenerates the cellulose to which a sizing property is ascribed. Decomposition of solution of sulpho-carbonate of cellulose is favored by sulphate of zinc and of magnesia.

To form an idea of the advantages which could be obtained in sizing paper, Dott. Levi prepared a certain amount of paper by hand, without size, and an equal amount of pulp mixed with viscose, beginning with 1 per cent. of cellulose and ending with 6 per cent.; he employed sulphate of zinc to cause decomposition of the sulpho-carbonate. From these experiments it appears that viscose possesses cementing properties, but not sizing, for all the samples, even that containing 6 per cent. of cellulose, were not sized. Besides this, the paper had a yellowish tint, less conspicuous in that dried at a high temperature.

The mechanical properties of the paper made were greater than those of ordinary paper, but Dott. Levi is of opinion that viscose is not advantageous for pulp sizing.

With regard to this communication, Dott. O. C. remarks that as regards employment of casein to size paper in sheets, the difficulties mentioned by Dott. Levi must have been already solved, judging from the extensive consumption of casein. In his opinion it would be well if sizing tests made in paper works were preceded by a study on the behavior of casein solutions prepared with various reagents, viscosity being determined, as also congealing point and cementing properties, knowing that results vary considerably in solutions made with alkaline and neutral reagents.

It is to be noted that the slighter degree of tenacity of paper sized with casein dissolved in ammonia, compared with gelatine size, is ascribable to the fact that the first is coagulated before the separate fibres are brought close so as to unite; thus lumps are left partially isolated. A proof that the experiments of Dott. Levi were not made in the best of conditions is given by his assertions that casein does not retain mineral fillings more, as Dott. Zanardi surely observes, it does. An interesting point upon which Dott. Levi might have dwelt is the preservation of paper sized with casein compared with gelatine for, as with the first sulphate of alumina is not employed, there is no possibility of free acid remaining in the fibre which, as is known, slowly causes hydrolosis of the cellulose and decomposes the fibre.

In the case of paper for records to be handed down to posterity, as, for example, public and private deeds, employment of casein should not be delayed, the more so as it not unfrequently happens that for the sake of economy gelatine is utilized which has been decolored or deordized with large quantities of sulphurous acid, which necessitates addition of lime to render the paper less hygroscopic. As regards the yellow tint of paper sized with viscose, this inconvenience has already been the subject of extensive researches. The remedy adopted is employment of sulphites to separate the yellow matter which is formed and precipitation of the sulphocarbonate of cellulose into alkaline solutions by aid of a saline mixture, so that subsequently the material thus purified does not lose solubility in water.

BROOM FIBRES IN PAPER MANUFACTURE.

The efforts that have been made hitherto to utilize the fibres of the broom for the preparation of paper pulp have not succeeded on account of technical or economic obstacles, says La Revue des Produits Chimiques. On the contrary, good results have been attained by employing the entire branches or roots of the shrub.

M. Scopinich operates in this way: The branches, twigs or roots are cut up and placed in a cold alkaline bath, for example, one of caustic soda of 10° Baumé, or else a bath formed of the carbonate of soda mingled with milk of lime, or a bath of potash or other alkaline substances, in suitable proportions for producing an effect equal to that of caustic soda of 10° B. Three or four days after the immersion the contents, disintegrated by the action of the alkali, are taken from the solution, pressed, washed carefully, and put in a bath of water containing chloride of lime in proportion of 1 or 2 per cent. They are left in the water for two or three hours, until they become sufficiently friable. Then they are removed and introduced into another washing bath, containing a small quantity of sulphuric acid or sodium hyposulphite. After these two operations are completed the material is ground in a suitable apparatus for a time sufficient to secure a pulp of the desired fineness. The alkaline liquid of the bath of caustic soda or other alkalies not only retains all the chlorophyl but also dissolves the gums and resins, of which a part is saponified, and a part set at liberty. By adding fats or oils the liquid of the bath may serve for the production of a compact soap of good quality.

BRITISH CHEMICAL MARKET.

Trade is steady, quotations are as follows:

Alkali, ammonia, 58%	£ 4	15	0
Alum, lump, barrels	5	0	0
Alumina, sulphate	3	10	0
Bleaching powder, 35%	4	15	0
Borax, crystals	13	0	0
Caustic, white, 76%	10	10	0
Caustic, white, 70%	9	15	0
Caustic, white, 60%	8	15	0
Soda ash, carbonated, 52%..	6	2	6
Soda ash, carbonated, 48%...	6	0	0
Soda ash, caustic, 48%	6	5	0
Sal ammoniac (2nds)	40	0	0
Soda crystals	3	2	6
Sulphate of ammonia	12	2	6
Sulphate of copper	21	10	0
Sulphur, rolls	6	12	6
Sulphur, flowers	7	12	6
Sulphur, recovered	5	10	0

PULP AND PAPER MARKETS.

Through the western paper States groundwood is holding stiff. There is no surplus to be noted anywhere. Although water is good in Wisconsin, the price of wood is still high. In sulphite there are very few mills that want to make any contracts, as higher prices are anticipated. They sell from month to month, and prices are running from $1.95 to $2.10. There was some surplus news in the market, but the election used it all up and prices are held firm for present business.

A recent report stated that groundwood was going from Canada to the Eastern States at the rate of a thousand tons per day; this, however, was pulp that had been held in storage, and the figure quoted was quite abnormal. Though pulp is going across the line from Quebec, there is no surplus in the market. Sulphite is stiffer; pulps from Scandinavia are quoted at much higher prices, and it is an easy matter for domestic sulphites to be placed, in many cases, at an advance. There is

a possibility of pulp going still higher.

Wood is much higher in Canada, from $1 to $1.50 per cord higher than last summer. Many of the streams used for the transportation of pulpwood are becoming more and more congested each season, as the cut increases in volume. They are too small to bring down the whole cut in one season, and a great deal of wood is hung up. A great deal was left high and dry last spring, owing to the water subsiding very quickly. This fact, together with the fact that very little pulp is being exported this season from Scandinavia, is going to make pulp higher this winter.

Quotations in New York for ground-wood are $18 to $20, f.o.b., at the pulp mill. Sulphite pulps are quoted as follows: Domestic bleached, $2.50 to $3.25; unbleached, $1.85 to $2.10; foreign bleached, $3.12 to $3.37; unbleached, $2.15 to $2.25; domestic soda fibre, $2.25 to $2.35.

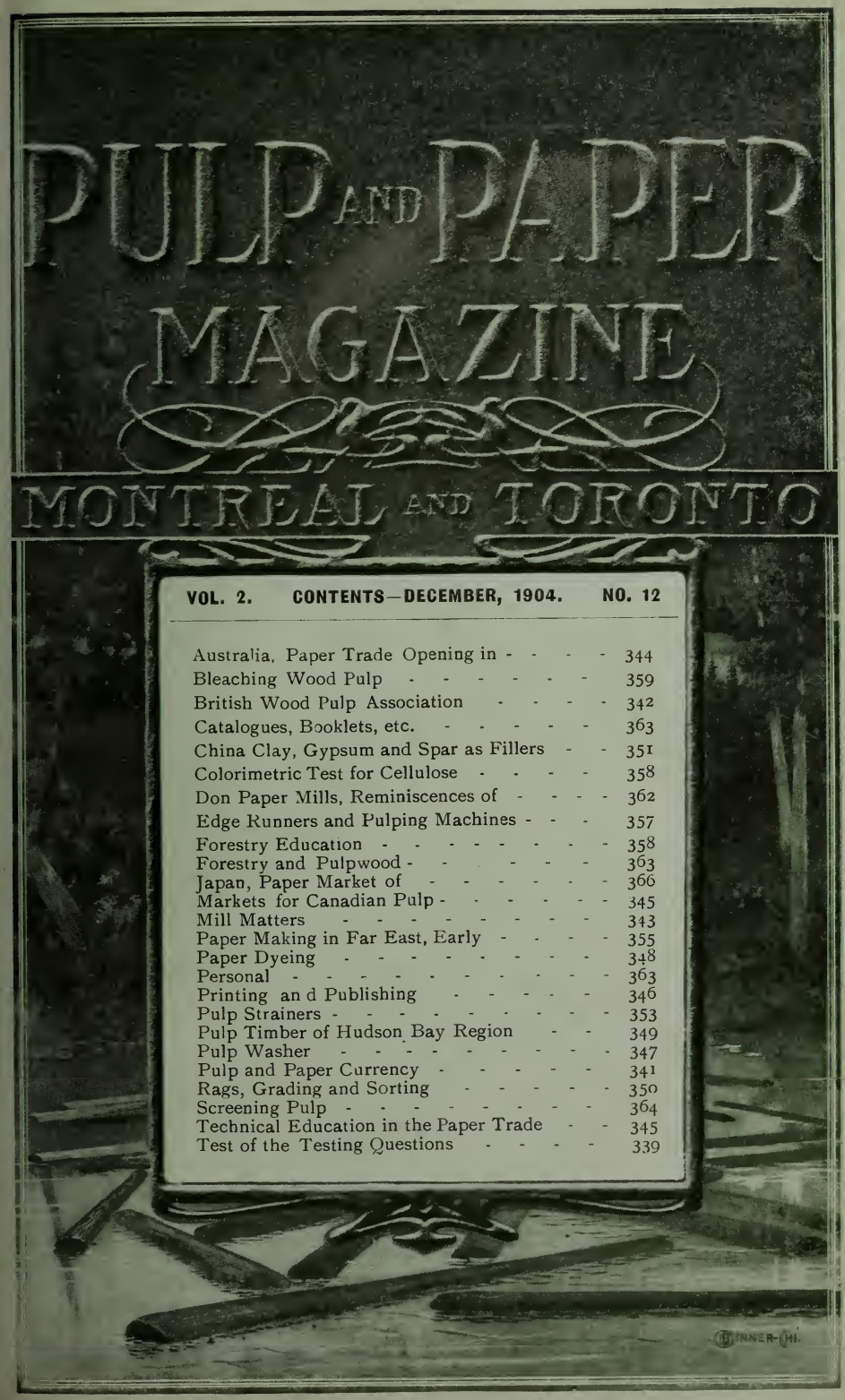
London quotations on ground-wood are from £2 to £2 2s. 6d. for 50 per cent. moist, and from £4 5s. to £4 10s. for dry. Sulphite pulp, bleached, is quoted at £12 to £12 5s, and unbleached at £9 to £9 10s. Soda, unbleached, first quality, brings £8 to £8 5s.

UTILIZING SULPHITE MILL WASTE.

The long sought for method of a practical and economic disposition of the refuse matter from sulphite pulp mills has at last been discovered, says the Essex County Republican, of Reeseville, N.Y. For years the J. and J. Rogers Company, of Ausable Forks, has been trying to find the answer to this troublesome question, and has spent thousands of dollars in experiments of various kinds. One of these objects has been to find a way to prevent the refuse from injuring the waters of the Ausable River, but while this has been the prime object, the company at the same time has felt that there must be some method by which this refuse matter could be developed into a valuable by-product of commercial value. At last the problem

has been solved. For some time J. S. Robeson, a chemist and inventor, has been experimenting at Ausable Forks with a new process for evaporating the waste liquor from the digesters, and

finally a small plant was erected to make a practical demonstration. This plant is now in operation, and is taking care of 10 per cent. of the waste liquor of the mill. The result is entirely satisfactory. The water is freed from all foreign substances, and emerges from the plant as clear as mountain spring water. All the pulp fibre and other substances are taken from it, and become a valuable product. This product is used for sizing paper, and is in great demand. It is also, by further treatment, hardened and made into cores for paper rolls. One hundred barrels of this material have already been produced, and the Rogers Company now sees the heretofore valueless refuse being turned into good dollars, and the obnoxious matter kept out of the Ausable River. Plans are already under way for the erection of a $35,000 plant, which will be able to treat the entire waste liquor of the mill. The present plant is the property of a newly organized company, the American Glucose Company, of which Mr. Robeson is president. This company will erect the new plant.



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THE
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A monthly magazine devoted to the interests of Canadian pulp and paper manufacturers and the paper trade issued between the 15th and 20th of each month.

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BIGGAR-SAMUEL, LIMITED,
PUBLISHERS
18 Court St., TORONTO. Fraser Bldg., MONTREAL

TEST OF THE TESTING QUESTION.

From the abstract given in another part of this issue, it will be seen that the question of chief interest which came up at the annual meeting of the British Wood Pulp Association last month was that of sampling and testing wood pulp. On the satisfactory solution of this question depends the development of the pulp trade between Canada and Great Britain, and upon it too, will depend to a vital extent the future position of the British pulp-paper maker as a competitor in the world's markets. Scandinavian pulp makers supply the bulk of the wood pulp used in British paper mills at present, but it has been for some years the hope and ambition of Canadian pulp makers to share this trade with Scandinavia, if not to take the place those twin states now occupy in the British market. If one could get at the true inwardness of the correspondence between the British Wood Pulp Association and the two Scandinavian associations, representing the mechanical and chemical pulp interests, one could form a better estimate of what is in store for Canadian shippers of pulp. The earlier letters in this correspondence start out with the statement by the British association that something should be done to end the dissatisfaction that prevails both among makers and consumers of pulp as to the question of excess of moisture, and a joint committee of the British and Scandinavian associations was proposed. To this both sections of the Scandinavian association agreed, but they wished to know whether the British committee would be composed of others than producers and consumers of pulp (hinting, apparently, at the agents or brokers who constitute a considerable proportion of the membership of the British Wood Pulp Association), and they also requested that the terms of the "contract note" should be discussed in connection with the question of sampling and testing. The British Association declined to bring the latter question into the field of discussion on the ground that the contract note had been in use for a year without giving rise to diffi-

culties. It was evident, however, that the contract note was not satisfactory from the Scandinavian side, as in that association's reply they said that while they would not insist on a total revision of this contract note, they would limit their demand to the revision of a clause against which they had always protested, namely, Section 2, the new version of which dropped the provision that "in the event of a claim for deficiency, etc., eight days' notice is to be given in writing to the seller to attend and control the sampling and testing, and that samples are to be drawn in the presence of the two parties or their representatives."

On this point negotiations came to a hitch for the time being, and as stated in the report, the British Association has said that it will take its own measures without reference to the Scandinavian pulp men. Neither the committee's report nor the correspondence discloses any hint of how the sampling and testing question is to be carried out in a way that will be fair and satisfactory to both pulp makers and paper makers. Certainly the methods now in vogue in Great Britain are as unsatisfactory to Canadian pulp shippers as to those of Norway and Sweden, and it may be well to remind British paper makers that claims for rebates and reductions on account of excess moisture do not occur to the same extent in Canadian shipments to the United States as to Great Britain. A number of Canadian pulp makers have, during the past five years, withdrawn altogether from the British market, and now confine their shipments to the United States and other foreign markets, where there is less trouble and loss from these claims. In this connection one of the letters addressed by the British Association to the Scandinavian pulp men should be noticed. In the course of this letter the secretary says: "In the meantime, after consultation with my chairman, I desire to point out to you: (a) That this Association is the originator of an attempt to revise the sampling and testing. (b) That the paper-makers express no dissatisfaction with the present system of sampling and testing. All the dissatisfaction comes from the makers of pulp and the members of this Association. (c) You overlook the fact that this Association is composed of bona fide agents, merchants, and manufacturers of wood pulp, and is the only Association which in any way represents the Canadian trade. There are volumes of extensive experiments, long investigations, and vigorous protests in the hands of the executive of this Association from the Canadian manufacturing members."

There are certainly protests on record from Canadian pulp manufacturers, but the British Association can hardly claim that it represents the Canadian trade. Agents who sell Canadian pulp may say they represent the individual mills for whom they sell, but there is no organization in Canada which can speak for the Canadian pulp manufacturers as a whole, and if a pronouncement were to be made to-day on the chief question involved, it would be found that the Canadian pulp manufacturer is more in line with the Scandinavian pulp maker than with the British Wood Pulp Association, which is not composed solely of pulp manufacturers. The correspondence makes it apparent that the Scandinavian pulp makers feel just a little bit shy in trusting their interests to their friends in the trade in Great Britain. The phrase "chose jugée," used by the secretary of the British Association, may be freely interpreted by some pulp shippers doing business in the Old Country: "Mene, mene, tekel, upharsin."

Now there is only one way for the settlement of difficulties such as those so commonly occurring in the sale and purchase of pulp, and that is for the seller

to give good, honest measure and the buyer to pay the full value of the goods without taking advantage of the distance that separates them; and a system or a contract note form which does not truly protect both parties will give trouble and damage the trade interests of both sides. On the face of the report of the meeting, it looks as if the paper makers were not willing to give time enough to enable the seller to prove the correctness of his bill. If this is not the case, the sooner the whole subject is threshed out and differences adjusted on a sound basis, the better for both sides.

Canadian pulp makers would like to extend their trade with Great Britain, but as a class, they do not wish to take advantage of injustice done to a rival. That is a kind of physic which they will sooner or later be called upon to take themselves. We do not question the general fairness and honesty of British manufacturers of all classes, but the paper makers of the Mother Country should see to it that the present methods of sampling and testing are reformed in such a way as to leave no doubt about their determination to place their buying and selling on the foundation of the Golden Rule. It is not upon that safe foundation at the present time, though no one will pretend that the short comings are entirely on one side.

Pulp & Paper Currency

As noted elsewhere, a severe drouth is being experienced in the pulp and paper sections of the United States, which bids fair to cause a famine of greater or less extent. It is not always realized, however, how it rests in the power of Canada to produce famine conditions in the United States at any time. Were it not for the wood and pulp obtained from Canada, the present situation would be a serious calamity to our neighbors to the south. The American market to-day is short of ground wood, even when every stone in the country is grinding. Canadian wood and Canadian pulp together form 33 per cent. of the total requirements of the United States, and should this be retained in this country, a famine would immediately be produced across the line. The situation is intensified at present by conditions in Scandinavia. Owing to the climate of those countries, it is practically impossible that the drouth should be broken before spring, and consequently that source cannot be looked to for supplies to relieve the situation in America. Under the circumstances, the recent decision of the Canadian Paper Makers' Association, not to raise prices for the present, should be greatly appreciated by the paper trade of the country.

At the recent Ontario Liberal Convention, the Government's future policy in the matter of pulpwood was expressed in the resolution given below, which indicates a radical change from the concession system to the auction system. Moved by Mr. Leckie, seconded by J. A. Halstead: "That before the pine and pulpwood on any of the lands now in the Crown are offered for public sale, a careful enquiry should be made by the Government to ascertain whether some method might not be adopted whereby the matured timber could be disposed of by open competition, to be cut under the direction of forest rangers, leaving the remainder of the pine timber and pulpwood to be cut when sufficiently matured for the market, and that all lands unfit for agricultural purposes on which pine has been cut should be reserved for reforestation, with a view to preserve for the future needs of the Province a source of revenue which has yielded since Confederation $40,000,000 to the Pro-

vincial treasury. That while this convention approves of the concessions already made for the establishment of pulp industries, as being the only practicable method of securing the necessary capital for their early development, the convention is of the opinion that in all future concessions north of the height of land, where large areas of pulpwood timber not interfering with pine timber limits and numerous water powers exist, and the water power and pulp concessions are both in the Crown, tributary the one to the other, that both should be submitted to public auction jointly, one of the conditions of sale being that the purchaser should pay a bonus for the right of occupation and an annual rental for the water power, as well as reasonable dues for the pulpwood required for the industry."

BRITISH WOOD PULP ASSOCIATION.

The annual meeting of the British Wood Pulp Association was held in London last month, C. T. Craig, in the absence of Capt. Partington, presiding.

The subject of chief interest dealt with by the executive committee was the sampling and testing of pulp. The committee reported that much correspondence had taken place with the Scandinavian associations for a whole year from Sept., 1903, to Sept., 1904, the result not being satisfactory to the British Association. The correspondence took place beween F. Becker, hon.-secretary of the British Wood Pulp Association, and Frantz E. Melhuus, secretary of Den Skandinaviske Cellulose-foreings Norske Afdeling. The British committee asked that something should be done to remove the dissatisfaction existing on the question of excess moisture, and a joint committee was suggested consisting of members of the British Wood Pulp Association, the Scandinavian associations, and the Papermakers' Association. The Scandinavian associations were prepared to send delegates, and thought it also advisable to deal with the contract note, with a view to revision. The Papermakers' Association and British Wood Pulp Association were not inclined to reopen the question of the contract note, as during the year it had been in use no difficulties had arisen. In reply the Scandinavian associations expressed their willingness to "limit their demand in so far to the point against which they have always protested, viz., that in section 2 of the new contract note the provisions had been dropped that in the event of a claim for deficiency, etc., eight days' notice is to be given in writing to the seller to attend and control sampling and testing, and that the samples are to be drawn in the presence of the two parties or their representatives, if attending." In regard to the proposed committee the Scandinavian associations were prepared to send four representatives in the interests of sellers in Norway and Sweden, and suggested four members to represent British buyers (papermakers), members of the British Wood Pulp Association not to act as members of the committee, but to join as consultative members with no voice in the matter. The British Wood Pulp Association, in reply, pointed out: "(a) That this Association is the originator of an attempt to revise the sampling and testing; (b) that the papermakers express no dissatisfaction with the present system of sampling and testing. All the dissatisfaction comes from the makers of pulp and the members of this Association; (c) you overlook the fact that this Association is composed of bona fide agents, merchants and manufacturers of wood pulp, and is the only Association which in any way represents the Canadian trade." No reply being received, the British Wood Pulp Association communicated to the Scandinavian associations that their committee intended to proceed with the question without the assistance of the Scandinavian associations, and that the opinion of the general meeting would be taken before doing so.

The result of the discussion of the report was that the committee was left to deal with the question either with or without the co-operation of the Scandinavian associations.

W. J. Mather, of Manchester, was elected secretary in the place of Mr. Becker, resigned.

Mill Matters

Rangers have surveyed over 50,000 acres of the extensive limits of the Quatsino Pulp and Power Company in British Columbia, and an average of 50,000 feet of good timber to the acre has been reported, consisting chiefly of spruce, balsam and fir. Plans for the mill, which is to have a daily output of 125 tons of pulp, are now being prepared.

The B. Greening Wire Co., Hamilton, Ont., have issued their calendar for 1905. This is got out with the same large print which has made it so serviceable in past years. The wire tables are retained, and the style in other respects is the same, but there is a notable change in the pictorial features, the top of the calendar showing the important additions which have been made to those large works during the last year or two. The company's buildings now occupy half a block on both sides of Queen St., between Peter and Napier. In addition to this there is the office and storeroom on the southwest corner of Queen and Napier, as shown in the calendar.

An issue of $1,200,000 of 7 per cent. cumulative preference stock was offered last month by the Laurentide Paper Company, through the Royal Trust Company, of Montreal, at 102½. The proceeds of the issue are to be applied to the paying of the cost of the enlargement of the company's paper mills, and provide additional working capital. On the enlargements spoken of, a great expenditure was made, $797,179 being due to the Bank of Montreal on that account. This expenditure has put the paper mill in a condition to work up all the output of the company's ground wood and sulphite pulp mills. It is stated that the industry at Grand Mere has been profitable from the beginning, dividends aggregating 37 per cent. of the ordinary stock having been paid out in the last five years. The enlarged works have been in operation since August 1st, and three months' operation has paid 16 per cent. on the ordinary stock ($1,600,000), after providing sinking fund and dividends on the preference stock now offered. The company's securities are largely held in Montreal.

The City of St. John has several alternative propositions for the utilization of the Mispec mill property, recently acquired, and three engineers have been appointed to report on the water-power available according to various plans of diversion. It has been estimated that the Mispec river, by a proper utilization of lake storage, is capable of developing 500-h.p. for twelve hours each day, after diverting the water required by the city for its supply. This power might be used by the city for lighting purposes, thus leaving the mill to be dismantled or operated by steam. Numerous enquiries have been received by the Mayor, as to purchasing the mill, but this matter cannot be gone into until the city decides definitely what uses it will make of the property.

The paper mill being built by the St. George Pulp and Paper Co., at Norwalk, Conn., is approaching completion. The first cargo of pulp from St. George, N.B., for the new mill was shipped the end of last month. The departure of the schooner from St. George was regarded as marking a new epoch for that port.

Price Brothers' Company is the name of a corporation recently chartered in Quebec with a capital of $2,000,000. The new company will take over the business now carried on by Price Bros. & Co., at Quebec, Montmagny, Batiscan, Rimouski and elsewhere, and will purchase the stock of the Price-Porrit Co., the Jonquieres Pulp Co., and the Montmagny Light and Pulp Co. The charter members of the new company are: William Price, Henry Edward Price, and Robert Ritchie, merchants; Gustavus George Stewart, advocate and King's counsel; Andrew Thompson, banker, all of Quebec; Ian Hamilton Benn and Edward George Price, both of London, England, merchants; Wm. S. Hofstra, of New York, merchant, and Granger Farwell, Chicago, banker. The company will have headquarters at Quebec.

Owing to lack of water, Eddy's and Booth's pulp mills have been running only intermittently for the past two weeks.

The Chicoutimi Pulp Co. shipped about 6,000 tons of pulp to the International Paper Co., during the autumn.

The Kingston Hosiery Co. is adding a plant for manufacturing paper boxes, which will soon be in full running order.

It was stated a short time ago that pulp was being shipped from the Nova Scotia Pulp Co. This must have been old stock, however, as the mill is not running.

Callender's Paper Manufacturing Co., who started a peat paper mill in Ireland, are receiving fresh life. A petition for winding up was held over and the company given power to issue 5 per cent. debentures to the extent of £4,000. It is now reported that a total of £1,390 has been raised, charged on the mills, patents, and other assets.

The Manitoba Free Press announces that application will be made at the coming session of the Legislature for the incorporation of a pulp and sawmill company which has been organized by Winnipeg and Minnesota men. The capital stock is placed at $300,000. The company will operate on the Winnipeg river, east of Fort Alexander. After they have got the pulp and sawmills in operation the same company will apply for separate incorporation to establish and operate an electric power transmission plant.

A new pulp mill is to be erected on the Maine side of the St. Croix river, near St. Stephen, N.B. The St. Croix Paper Co., who will erect the mill, has been organized only a few weeks, though the industry has been in contemplation for years. The mill will be capable of turning out 100 tons of paper daily. The plant will give employment to 400 hands, and it is expected that a village of 1,500 people will spring up around the mills. The company owns 210,000 acres of timberland along the St. Croix river, and at Sprague's Falls, where the mill is to be built, there is power enough for a plant ten times the size. The St. Croix Paper Company is capitalized at $2,500,000, and has elected officers as follows: President, Frank Todd, of St. Stephen, N.B.; vice-president and general manager, Isaac B. Horeford, of New York City; treasurer, A. L. Hobson, of Boston; clerk, B. V. Curran, of Calais, Me.; directors, Frank Todd, F. H. Todd, of St. Stephen, N.B.; J. L. Hobson, A. L. Hobson, John A. Knowles, of Boston.

Application is being made at Fredericton for incorporation of a company to be known as the Miramichi Pulp and Paper Co. The object of the company is to acquire the property of the Maritime Sulphite Fibre Co., at Chatham, N.B., and carry on a pulp and paper business in that town. The company is to be capitalized at $300,000. The applicants are: George T. Keyes, East Pepperell, Mass., president of the Nashua River Paper Co.; James Beveridge, St. John, paper maker; Chas. A Haight, Boston, Mass., attorney; Chas. W. Keyes, East Pepperell, Mass., paper maker; Henry W. Keyes, Haverhill, N.H., paper maker; the first four mentioned to be provisional directors. James Beveridge, who was formerly with the Cushing mill, has been appointed manager of the Chatham mill. The machinery is being overhauled, and it is expected that the mill will start in January. Pulpwood supplies are being stored on the grounds. The mill will run to its full capacity. Whether the output will be manufactured into paper at the East Pepperell mill, or whether a paper mill will be erected at Chatham, has not yet been definitely decided. It is stated the question of freight rates to New England has been satisfactorily settled with the Intercolonial Railway.

PAPER TRADE OPENINGS IN AUSTRALIA.

D. H. Ross, Canadian Commercial Agent at Melbourne, writes as follows of openings for Canadian paper:

A large and wealthy Melbourne firm—with established branches throughout Australia and New Zealand—wishes to be placed in direct communication with a Canadian paper mill. The firm in question, for years past, has done an immense business in "news" paper and all kinds of

printers' supplies. Their distributing power is so great that it offers an exceptional opportunity for Canadian paper mills to establish a direct purchasing agency upon the very best basis. I strongly urge paper manufacturers to take note of this enquiry, and also to promptly communicate with the Department of Trade and Commerce, Ottawa, for the address of this influential and important company.

It is impossible to ascertain, with any degree of accuracy the quantities and values of butter paper imported into Australasia, as this item is not separately classified in the customs returns. From careful enquiries made, I am of the opinion that at least 700 tons will be required by Australia and New Zealand for the butter season of 1904-05. In the marked development and extension of the dairying industry there is certain to be an increasing demand. Butter paper—classified as "true vegetable parchment"—is duty free according to the Commonwealth customs tariff. Europe—principally Belgium—supplies the bulk of the importations.

I know of several importers in these states who would be glad to receive samples and quotations of Canadian butter paper upon the basis of f.o.b. (free on board) steamer, New York, or, preferably, upon the basis of c.i.f. & e. (cost, insurance, freight and exchange) Melbourne. Any particulars forwarded to this Canadian commercial agency are assured of receiving every consideration from leading importers and consumers of this product. The address of one of the largest importers of butter paper in Australia can be obtained upon application to the Department of Trade and Commerce, Ottawa, should manufacturers prefer to communicate direct with them.

In this connection it is interesting to note the following items gleaned from statistics supplied by J. S. Larke, Canadian Commercial Agent at Sydney. The figures given show the value of the imports from Canada during the years 1901-02-03:

	1901.	1902.	1903.
Books	£393	£176	£275
Printing machinery.	248	229	490
Printing paper.....	1,078	3,189	2,116
Writing paper	523	359	907
Wrapping paper	38		24
Paper hangings	....		543
	£2,242	£3,991	£4,355

It will be seen that while the whole volume of trade for these items has increased, the separate amounts have varied in anything but regular fashion during the three years.

TECHNICAL EDUCATION IN THE PAPER TRADE.

Editor, Pulp and Paper Magazine.—

Sir,—The interest of stationers and printers in the subject of paper is evidenced by the large attendance of men at lectures which I am now giving in London in the Central Y.M.C.A. on the subject of "Paper Making and Paper Testing." The total attendance at this class is 260, and when you learn that last year a similar course was attended by 320 men, you will readily understand that on this side commercial and business men are alive to the importance of technical knowledge. The samples submitted to me for illustration at the lectures by the students form valuable evidence of the need of an adequate acquaintance with the technology of a growing industry.

Yours faithfully,

R. W. SINDALL.

Chamber of Commerce Bldgs.,
London, Eng., Nov. 26th, 1904.

MARKETS FOR CANADIAN PULP.

In an interview with the Pulp and Paper Magazine, W. P. Ryrie, of the Ryrie Paper Co., made the following remarks in regard to the present condition of the trade in mechanical wood pulp for export: "In view of the fact that we, in Canada, are now supplying nearly 20 per cent. of the total British requirements in this commodity, as well as a small proportion of the United States demand, it becomes a very important question as to which is to be the market of the future. Situated as we are, it would appear as though our neighbors to the south must eventually become our

chief customers, but a number of our largest mills are geographically situated so that the British market holds out inducements, where the cost of shipment by rail on this side is very high. It is claimed by some of our pulp makers that the treatment received at the hands of the British paper makers is not all that could be desired, but to those who are conversant with the methods of testing, there can be nothing fairer in theory, though in practice it would appear to discriminate against our pulp makers. The procedure is to make tests at the mill on receipt of shipments, and if these do not come within 1 per cent. of the invoiced weights, the services of an official analyst are called in to determine the exact moisture, thus arriving at a definite result, the settlement being effected on the basis of his award. On the face of it there could be nothing fairer than this procedure, but a number of our producers cannot understand why there should be such discrepancies as exist between their own mill tests and the results arrived at on the other side.

Some pulp makers state that on shipments to the United States, where the goods are turned out and shipped under exactly similar conditions, claims will not occur once in twenty times, and it is hard to conceive why there should be such differences. Added to this, the inducement held out for sending our outputs to the south are numerous, chief amongst which might be mentioned the fact that to many of our mills the price paid is higher, and in a great many instances the pulp is stowed in a car, wrapped in its own nakedness, whereas for shipments to Europe it must be baled, which entails an additional cost of some 40 to 50 cents per ton.

The opinion prevails in many circles that, speaking generally, the market for our production will eventually be almost exclusively in this country and the United States, leaving the British market to the Scandinavians.

Personally, I feel that the paper makers in the Old Country do not appreciate the advantages which they have derived from the fact of a very considerable competition of the Canadian producers, as it is beyond question that had it not been for the supplies from Canada, the Scandinavian pulp men would have received much better prices than they have had during the past two or three years. The matter of quality calls for no comment, as little or no fault is to be found with our pulp where the requirements of the British paper maker are studied, and in point of fact, they are more exacting than the users on this side of the Atlantic."

PRINTING AND PUBLISHING.

J. & A. McMillan, printers and stationers, St. John, N.B., were burned out this month for the eighth time in the 82 years during which the firm has been in business. Damage, $45,000; partly covered by insurance. Cause of fire unknown.

The Canadian Preference League will next month issue the initial number of a magazine to be known as "Canada First."

Messrs Miller & Richard, the Scotch type founders, are opening a branch in Winnipeg. A warehouse 90 feet square is being erected, and 1,000,000 pounds of type will be kept in stock.

La Presse Publishing Co. has been incorporated at Montreal, under a Dominion charter, with $1,250,000 capital. The company will acquire and publish La Presse newspaper, and carry on a general printing and publishing business. The incorporators are: Hon. Trefflé Berthiaume, M.L.A., journalist: Herménégilde Godin, manager; Siméon Beaudin, K.C.; Louis G. Gratton, general superintendent, and Joseph E. Dupont, superintendent.

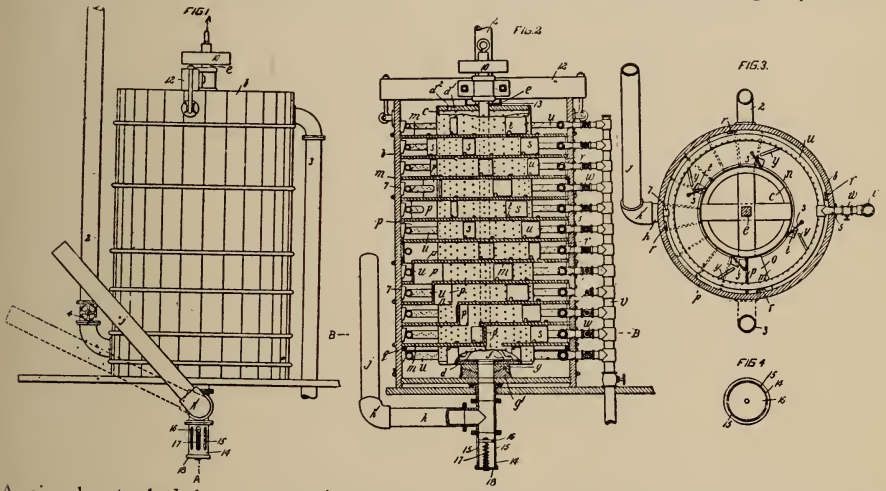
A change is being made in the stock holdings of the Saturday Night, Toronto, by which E. E. Sheppard will obtain complete control. Application will be made for the incorporation of the Saturday Night, Limited, which will be entirely distinct from the Sheppard Publishing Co.

The contract has been let for a building for the St. John Times, the new evening paper in that city. It is to be of four stories and will be the largest newspaper building east of Montreal.

PULP WASHER.

Horace Greeley Turner, of Montreal, has been granted a patent on a pulp washer.

Figure 1 is a side elevation of a pulp washer constructed according to the invention. Fig. 2 is a longitudinal vertical sectional view thereof, taken on line A A, Fig. 1. Fig. 3 is a horizontal sectional view taken on line B B, Fig. 2, and with the series of openings in the horizontal partitions shown in dotted lines; and Fig. 4 is a horizontal sectional view of the automatically variable discharge valve.



A circular tank *b* has a screening member in the form of a cylinder *c* therein, preferably constructed of perforated sheet metal and extending from within a short distance of the bottom thereof to a point within a short distance of the top. The lower end of this screening cylinder has a bottom *d*, to which the lower end of the driving shaft *e* is rigidly connected, as at *f*, and the upper end has a solid head d^1 with an opening d^2, to prevent a vacuum forming in the interior of the cylinder, while an annular bearing block *g* of truncated conical form upon the under side of this bottom rests in a correspondingly formed annular bearing seat g^1 upon the bottom of the tank, thereby guiding the lower end of the screening member and centralizing it when it is inserted. A flexible shield in the form of an annular apron is fastened to the conical bearing block *g* and hangs downwardly over the bearing seat g^1 and keeps the pulp from leaking through the bearing faces, but allows the water to pass. A discharge pipe leads from the bottom of the tank and communicates at its upper end with the interior of the screening cylinder (through the opening in the bearing block and its seat), and at its lower end through a T with one end of a pipe length *h*, the opposite end whereof has a loose joint elbow h^1 thereon, having the main discharge pipe *j* mounted rigidly in the other end thereof, such discharge pipe, through the medium of the elbow, being adjustable to different angular positions to vary the height of its discharge end, and consequently adjust the resistance to the substance flowing through the screening cylinder. The automatically variable discharge valve is connected to the lower end of the T.

A series of horizontal annular partitions *m* are disposed a short distance above one another within the tank, and with the wall of the tank and the screening member they form a series of stages in each of which the pulp passing through the tank receives an independent washing. These plates are of a width to extend from within contact with the interior of the tank to within close proximity to the screening cylinder, the spaces between the inner edges of such partitions and the screening cylinder being closed by flexible packing rings *n* while each partition is provided with an

opening *o*, the openings of the series of partitions being set in different angular positions, and the corresponding side edge of each opening has a vertical partition *p*, extending upwardly to the opposite side edge of the opening in the annular partition next above it. The lower-most annular partition is supported on a ring *q*, secured rigidly to the inside of the tank a short distance above the lower end of the screening cylinder, and the other annular partitions are supported upon distance pieces *r*, each resting upon a partition and supporting the one next above it.

A series of doctors *s* are pivotally connected at one side edge to the annular partitions between which they extend, and a series of springs *t* yieldingly maintain these doctors in bearing relation with the screening cylinder.

A series of perforated annular pipes *u* of preferably upwardly progressively decreasing capacity are located one in each stage, and they are of sufficient diameter to encircle the stage near the outer periphery thereof. These annular pipes are fed from a common feed pipe *v* through a series of branches, each controlled by a valve *w*, and a series of nozzles *y* communicate at one end with the perforated pipes and are disposed to direct a jet diagonally upon the doctors to prevent the collection of pulp on the latter. The object of the diagonal arrangement of the jets is to cause it to agitate the thickened stock.

The branch pipes, which connect the common water feed pipe to the annular perforated pipes are connected to such annular perforated pipes by plug joints 5 to allow the perforated pipe or sprinklers to be easily removed. A series of wedges 7, driven between the interior of the tank and the sides of the sprinkler pipes opposite to the common supply pipe, keep the sprinkler pipes in place, and the upper end of the driving shaft is provided with a driving pulley 10, and such shaft bears and is localized in a vertical opening or a bearing box in a transverse girder 12, supported upon the top of the tank, while an oil tray 13, located beneath the girder and encircling the shaft, prevents the drip of oil from the bearing box or pulley reaching the washer.

The automatically variable discharge valve connected to the lower end of the T, as before mentioned, consists of a short sleeve 14, having a series of longitudinal valvular slots or ports 15, and a valve disk 16 within this slotted sleeve is supported by an expansible helical spring 17, supported in turn upon a cap 18, closing the lower end of this sleeve.

The valve controlling the intake pipe is opened and the pulp laden water is allowed to flood the tank. In so doing the pulp laden water must first fill the first stage and then rise through the opening in the first annular partition into the second stage, around which it is made to circle until it comes in contact with the vertical partition, when it will rise through the next opening to the third stage, and so on until it reaches the topmost stage. As it flows around each stage the water will flow through the screening cylinder to the water discharge pipe, which it floods, and simultaneously sufficient fresh water will be sprayed into the stage to maintain the original or any desired consistency, thus causing a change of water in each stage, and consequently a progressive step by step washing of the pulp. As the washing water flows from the different stages into the screening cylinder the level in the latter will gradually rise until it overflows the discharge end or mouth of the adjustable discharge pipe. By adjusting this discharge pipe to different angular positions, the working head is varied, and the degree to which it is set is uniformly maintained by the automatically variable discharge valve.

PAPER DYEING.

Paper dyeing may be divided into dyeing the pulp and dyeing the finished paper. In the latter case aqueous solutions of first the rosin soap, then the dye solution, or gum and painted on to the paper. In pulp dyeing the usual method is to add first the rosin soap, then the dye solution, and then the fixing solution. In this way

the paper is sized and dyed with an insoluble lake at the same time. Bleached pulp must be nearly free from chlorine when dyed, as the chlorine may destroy the dye. In dyeing with acid dyes the lake is precipitated with various metallic salts, such as barium chloride or sugar of lead, according to the nature of the dye. Blotting paper is best dyed with substantive dyes as it is disadvantageous to use a mordant.

Variegated papers are made by incorporating dye fibres of jute, chopped small, with the pulp after sizing. The jute is dyed with, at most, one to one and a half per cent. of dye and sulphate of alumina or soda. The following is an example of the process of pulp dyeing. To 1000 lb. of pulp add first the dye, then 4 lb. of sulphate of alumina, and then the size. If a quantity of tannin equal to twice or thrice the weight of the dye is also added, the color will be faster. The size is made by boiling 10 lb. of rosin and 2 lb. of calcined soda in a gallon and a half of water for about three hours. Allow the mass to stand, skim it, and dilute to ten times its volume in distilled water.

For lithographic purposes and for getting colored papers fast to water, aniline dye lakes are painted on with a gelatine vehicle, and the surface is lustred when dry by calendering. The lakes are made by adding solutions in water of the dyes to kaolin, gypsum, starch, blanc fixe, etc., and for lithographic purposes to hydrate of alumina made by precipitating a solution of 12 lb. of alum or sulphate of alumina with one of 5 lb. of calcined soda. The following are some good recipes:

1. For Basic Dyes—Dye, 2 lb., dissolved in:

Water	200 lb.
Kaolin	10 to 40 "
20 per cent. tannin solution	20 to 25 "
20 per cent. sulphate of alumina solution	20 to 25 "

2. For Acid Dyes—Dye, 2 lb., dissolved in:

Water	200 lb.
Kaolin	10 to 40 "
20 per cent. solution of barium chloride	20 to 25 "
20 per cent. solution of alumina sulphate	20 to 25 "

3. For Resorcin Dyes—Dye, 2 lb., dissolved in:

Water	200 lb.
Kaolin	10 to 40 "
20 per cent. solution of sugar of lead	20 to 25 "

4. For Substantive Dyes—Dye, 2 lb., dissolved in:

Water	200 lb.
Kaolin	10 to 40 "
20 per cent. solution of barium chloride	20 to 25 "

When the lakes have been filtered off and dried, they are ground, mixed with vehicle, and applied to the paper, which is calendered when dry.—Farben Zeitung of Berlin.

PULP TIMBER OF THE HUDSON BAY REGION.

In a recent letter to the Globe on the resources of the Hudson Bay district, J. W. Tyrrell, the explorer, says this region is not, as a whole, a great timber country. Indeed, the northern half of the district is entirely devoid of timber of any description, but the land of the southern half is covered by forests of more or less value, some river valleys and more favored localities being well wooded by valuable trees of good size.

The various trees include white elm, white pine, red pine, black ash, cedar, jack pine, balsam fir, canoe birch, the poplars, larches, and spruces. Of those suitable for pulp, he says:

Aspen, or Common Poplar.—Has about the same northern limit as the birch, and is the most widely diffused tree of North America. It is very abundant within its range throughout the Hudson Bay district, and is one of the most valuable of the forest trees, being commonly as much as 10 or 12 inches in diameter.

Balsam Poplar, or Balm of Gilead.—Extends considerably further north than the white poplar, but is much less common. East of Hudson Bay this tree is found as far north as Richmond Gulf. West of the Bay it disappears near Fort

Churchill, and thence its limit extends in a northwesterly direction, about parallel with those of the other northern trees.

Black Spruce.—Is by far the most abundant tree in the Hudson Bay district, forming, I should judge, 75 per cent. of the whole forest. It is much to be regretted that this tree does not attain a larger size, being, as a rule, too small for the manufacture of lumber.

White Spruce.—Though much less abundant than black, is very common everywhere throughout the forests of the Hudson Bay district. Its northern limit, which is about the same as the black spruce, is, on the east side of James' Bay, in about latitude 57 deg., a few miles north of Richmond Gulf. On the west coast of the Bay the limit extends to latitude 59 deg., at the mouth of the Seal river; thence it extends in a northwesterly direction, passing close to the mouth of the Copper Mine river, and on to the mouth of the Mackenzie river. In latitude 62 deg. 15 min. north, on the shore of Cary Lake, I have seen white spruce trees the largest of which measured 29 inches in diameter, two feet above the ground. This was, of course, very exceptional. Mr. Low reports 18 inches as no uncommon size for the species in Labrador, and 20 inches at one locality, near Lake Mistassini. Dr. Bell reports cut spruce logs on Lake St. Joseph 18 and 20 inches in diameter.

In connection with the forest resources of the district, it is very much to be regretted that disastrous bush fires are of more frequent occurrence, and some system of fire prevention is of the highest importance if these great resources are not to be destroyed

GRADING AND SORTING RAGS.

In a fine writing and printing mill where many different qualities of paper are made the work done in the rag house is necessarily important and the examination, sorting and grading of the rags after they reach the mill requires experienced supervision. Many of the trade grades are sorted or sub-graded by different mills into qualities with different numbers or names so that the system of classification is only an arbitrary one.

In a general way, however, the rags may be classed as follows:—

(*a*) New Material.—Hemp, linen, cotton (white and colored), bleached and unbleached. This includes English and foreign white cuttings; moleskins; muslins; canvas; brown, grey and cream linens; light prints; shoe linings; stay cuttings, etc.

(*b*) Clean white cotton and linen materials that have been used and washed. This includes English, superfines, fines; French, 1 and 2 linens, and No. 1 cotton; German SPFFF and SPFF; Dutch, extra fines; Belgian, 1 and 2, white linens, etc.

(*c*) Soiled white and colored rags, including outshots, seconds, thirds, old canvas, blue cottons, house cloths. SPF and the lower brands of German linen, old rope, etc.

In class A the sorting of unbleached cotton and linen and new canvas takes a minimum time and is of an easy description, generally resolving itself into cutting up the larger pieces into a suitable size for the machine cutter. New white cuttings require somewhat more attention. There is often a considerable quantity of loading and starchy matter present, some material containing as much as 30 and even 40 per cent. If there is much of this it is revealed in the preliminary examination of the rags in the bale, a claim, of course, being made on the seller. Long muslin strips are cut, and silk and woolen faced material are looked for. Very small stuff is generally objected to, owing to the mechanical loss likely to occur in dusting.

New colored prints need careful sorting. There is the division of fast and fugitive colors to be made, and a good sorter will skilfully discriminate between these. The chief evil is the rubber and mackintosh article—a triumph of the maker's art which often deceives the

most expert over-looker, so like is it to the ordinary print. The boot and shoe lining variety take time when much of it is composed of linen and jute.

In class B the parcels of cotton articles that have seen better days, but are still fairly strong and clean, offer some scope for the grader. Where, for instance, a soft cotton half-stuff is wanted for a moderately priced paper, the rag may be selected from a consignment of fines, and this takes the maximum time. Incidental to the sorting of these for the softer rag a number of other sorts are made, and it is possible for the parcel to yield something like the following: soft cottons 70 per cent., strong No. 2 cottons 15 per cent., new cottons 4 per cent., old linens 3 per cent., No. 3 cottons 6 per cent., and the discriminating capacity of the sorter is sometimes taxed in deciding the line which divides hard from soft rag in a bale of old material. Rags in this class require attention for the cutting of seams and removal of buttons.

It is in Class C where the greater quantity of objectionable matter is found. In the case of extremely dirty rag, it is advisable, if only from a humanitarian point of view, to treat it to a sprinkling of a deoderiser, and a preliminary dusting before weighing it out to the sorters. In inferior outshots, seconds and S.P.F., there is generally a miscellaneous collection of rubber, buttons, string, cardboard, paper, etc., to be picked out. It is, however, not always a question of parting rag and rubbish with these qualities. The art of grading is often extended to them. Although, as a rule, rag merchants grade on fairly definite lines, observing a certain give and take in the way of mixing, they are not all connoisseurs on fibres, nor cognizant with the divisions the mill makes of a trade grade, and so occasionally an expert supervisor gets a small harvest of superior rag from a parcel of the C type. A consignment of outshots at 9s. 6d. per cwt. will sometimes yield 15 per cent. of strong and 5 per cent. of soft cottons, of fines quality. From some seconds a fairly good outshot cotton is made, and with old canvas a picking of new stuff worth about 20s. a cwt. may be obtained. The lower grades such as thirds are often an inextricable and almost unrecognizable mixture of dirty linen and cotton articles, but a careful sorting is sometimes rewarded by a few good cottons being made. Of all material, old tarred rope presents the least difficulty in actual sorting, and the maximum in preparing. Before the sorter can be said to have done with it, the process of fitness for the bleaching department, presuming it is to be used for good white paper, is probably as follows: hand cutting; machine cutting; devilling; back to the sorter to complete the unravelling of the strands; a second devilling and sometimes a third, after boiling.

The sorter's connection with the hemp waste and like material is the removal of the larger woody tissue and shaking it at the lattices, which has to serve in the case of such loose-fibred material for the more complete dusting by machinery.—J. Jonns, in Paper Makers' Monthly Journal.

CHINA CLAY, GYPSUM AND SPAR —THEIR MERITS AS FILLERS.

It may be thought that if a filling is only white, it can always be used for any and every kind of paper, and that if whiteness and cheapness go together, the selection of a filling is not such a difficult matter. This view is, however, by no means correct, as the nature of a filling plays a very important part.

We need only consider here the three most commonly-used fillings, namely, china clay, gypsum and heavy spar, as they are the cheapest and also possess the characteristic properties which I wish to discuss. Asbestine and talc are also much used, it is true, but the use of these fillings is confined almost entirely to high-class papers, the absolute whiteness of which is the principal desideratum. The

main question for every analyst is: How can these three substances be most quickly identified? As every paper chemist possesses a microscope, he is in a position to carry out easy microchemical analyses, which in the present case are most decidedly to be preferred to those on a larger scale.

To identify china clay, the well-known ignition test with the ash and treatment with a drop of cobalt nitrate, which produces a blue color, the cobalt ultramarine or Thenard's blue, may be employed and is easily carried out with the coherent ash. Gypsum is most rapidly identified microscopically. As, however, gypsum which has been ignited is only soluble with great difficulty, it is better to work with the unignited paper. A fragment of the paper is boiled with a drop of distilled water, and the water renewed until the paper is thoroughly extracted. After gentle evaporation, the concentrated drop of gypsum solution is allowed to cool, when fine crystals will deposit round the edge, and which may be readily recognized even on slight magnification. The long needles with their characteristic points can be easily seen and are a sure and certain proof of gypsum. No reagents whatever are required to detect this substance, and with a little practice the operation can be very quickly and accurately carried out.

Heavy spar causes the investigator somewhat more trouble, but after a little practice the manipulations can be performed quite easily. A minute quantity of the ash is taken and boiled with a drop of concentrated sulphuric acid on the slide. This operation will at first be found difficult, as the drops run off and the slides easily crack with the heat. A few attempts will nevertheless overcome these little troubles. When sufficiently boiled, the preparation is allowed to cool, the dissolved barium sulphate crystallizing out but very slowly. The crystals are, however, visible in a few minutes, and take the form of minute stars.

Having thus indicated how fillings may be rapidly detected, we may now proceed to discuss their properties. There are papers which it is desirable should be opaque, whereas others must be as transparent as possible; again, others must be hard and tough, while some papers must be soft and lie as flat as possible. All these requirements cannot obviously be fulfilled by one particular filling. The best results will be obtained by taking not only the composition of the stuff, but also the nature of the filling into consideration. Take, for example, a paper which must be produced as cheaply as possible, and must yet be fairly hard and bulky. Papers of this kind will be invariably found to be made with a mixture of china clay and gypsum, these being the two cheapest; moreover, gypsum imparts a peculiar hardness to a paper. I have always noticed that papers which were fairly heavily loaded and yet bulky, invariably contained gypsum, whereas heavily loaded papers, which contained china clay only, were of a soft, limp nature, and could only be used for printing purposes.

Writing papers, which it is desired should be resonant, should be preferably prepared with gypsum. The look-through is also better and clearer when gypsum is used. China clay always dims the transparency. It is better, however, to mix the two fillings together, as gypsum alone causes too much loss and is consequently unprofitable. As a rule, gypsum, on account of its solubility, entails more loss than the other fillings. To produce opacity in thinner papers, such as thin printings, it is preferable to use china clay. In chromo papers the chief requirements is that they shall lie perfectly flat, and to this end a very heavy filling should be chosen, which will compel them to do so by its high specific gravity. The best filling for this purpose is heavy spar, and many excellent chromo papers which I have specially examined for fillings contained heavy spar.

It is manifest that a unit weight of heavy spar will occupy a much smaller paper will be less prejudicial to the felting clay or gypsum, and for this reason a fairly high percentage of heavy spar in a paper will be less prejudicial to the felting of the fibres than would be the case with a specifically lighter material. For the same reason also the transparency of the paper will be comparatively clear and the

tensile strength greater; the thickness, however, is slightly less for the same weight per square metre, while the total specific gravity will have increased. Heavy spar may also be detected by a much shorter method, without a microscope. As with coated papers, it is only necessary to make a streak on the paper with a gold ring and a distinct grey mark will be produced.

As a rule, the fillings which are individually most suitable for a given kind of paper are—gypsum for papers which must be resonant and tough, china clay for opaque papers, and heavy spar for fine printing and chromo papers which must lie flat readily. In working to pattern, the manufacturer should always see that the nature of the filling is ascertained, and as the operation, as above described, is not difficult and does not take up much time, it can easily be carried out by most paper chemists.—E. L. Selleger, in Der Papierfabrikant.

PULP STRAINERS.

The accompanying illustrations show a pulp strainer for pulp manufacture with vertical strainer plates between which is arranged a part (a swinging plate pivoted at the end or in the centre) for producing pulsations in the pulp.

Figs. 1 and 2 show respectively a cross section and a longitudinal section of such a strainer with bottom discharge. In the casing *a* with a bottom outlet *b* are arranged two vertical strainer plates *d*, below which a channel *c* is provided, covered at the top by a detachable cover *e*. Below the cover is the inlet *f* for the pulp to be strained, admitting it into the working chamber A between the two plates. The chamber A is closed at the bottom by a rotatable plate *g* which, when necessary, allows communication to be established with the channel *c*. Between the two strainer plates is arranged centrally a through spindle *h* supported outside in stuffing boxes and carrying a perforated or non-perforated swinging plate *i*. This swinging plate (or plates, as several pairs of strainer plates can be arranged behind each other in separate working chambers) is rocked to and fro between the plates *d* by means of a suitable eccentric mechanism through a lever *k*. The result of this movement is that the material supplied for the purpose of being strained, is forced by the said swing plate from one side, at the top, and from the opposite side, at the bottom, through the

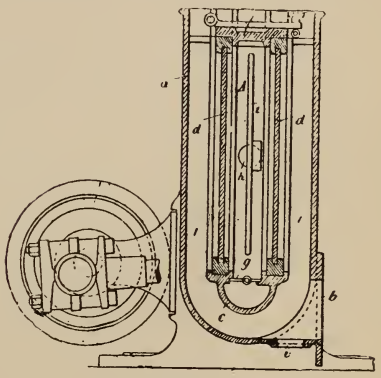
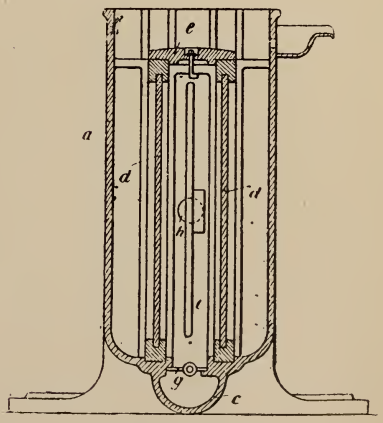


Fig. 1



Figs. 1 and 3.

strainer plates, and at the same time, the other half at the top, and the opposite half at the bottom, exercise suction on it. The purified strained material passes through the slots in the strainer plates, which retain the knots, etc., into the space *l* of the casing *a* and is discharged through the outlet *b* of the latter, while the knots and other heavier impurities sink to the bottom and collect in the

groove *c*, as during the operation the valve *g* remains open. If it is desired to clean the channel *c* from the impurities which have accumulated therein, the working is stopped, the plate *g* closed and the groove emptied through a suitable lateral discharge valve or door at *s*. The suction produced by the swing plate assists in the removal of any impurities that may have collected over the slots of the strainer plates, that

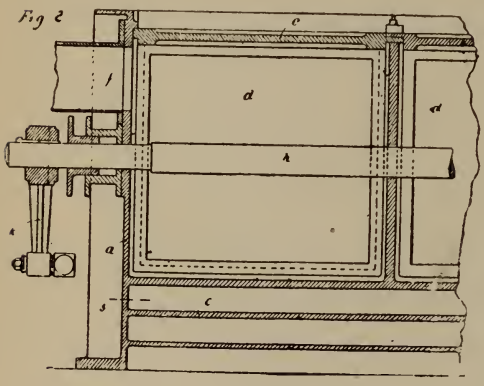
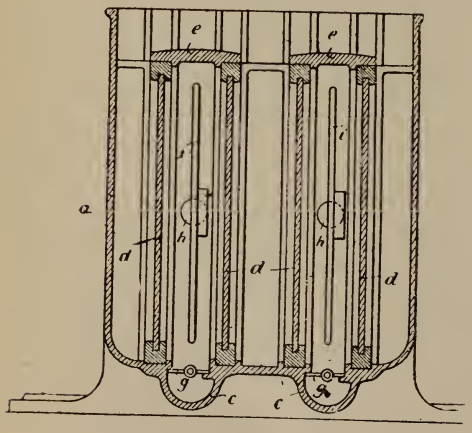


Fig 4



is to say, it continuously cleans the strainer plates, and as during the working all impurities are continuously allowed to sink to the bottom, the slots of the strainer plates always remain clean and unobstructed. The result of the construction described is that the rocking movement of the swinging plate is fully utilized, that is to say, when the halves of the swing plate approach a strainer plate, the material is correspondingly forced out, and at the same time it is sucked in at the opposite side. each of the two halves produces, therefore, above or below the swinging axis, a suction and a forcing action. Owing to the arrangement of the swing plate between two strainer plates, it works continuously with each of its halves, and simultaneously exercises both a sucking and a forcing action, while, if the swing plates were not arranged between two strainer plates, they could only be half utilized. The result is that the dimensions of the swing plate need be only half as great as would be required if the latter acted only on one side, and this means, of course, reduced consumption of power, combined with an advantage which is not to be despised, that the external dimensions of the apparatus are also reduced by about one-half. The vertical arrangement of the strainer plates has a further advantage that the heavier particles naturally continuously sink to the bottom, even though following a zig-zag path on account of the movement of the swing plate, and meet no obstacles on their way and have no opportunity of collecting at some undesirable spot. The described action of the swing plate is assisted by the fact that any escape of the material upwards (as happens in the case of open pulp strainers) is prevented by the space between the two strainer plates *d* being closed at the top, so that the material can escape merely through the slots in the strainer plates. For cleaning the apparatus there is arranged at its lowest point a washing valve *v* which can be opened from the outside.

Fig. 3 shows a pulp strainer with outlet at the top, in cross section. Generally the construction is the same as that shown in Fig. 1, with the difference that the lateral chambers do not communicate at the bottom, but the overflow box is placed so high, that the cover is flooded by the material.

Fig. 4 shows a double pulp strainer of

the same construction in cross section. Two single pulp strainers are arranged in the same casing, and the swinging levers are coupled together and are operated simultaneously by the same driving device.

A British patent has recently been granted to Philipp Nebrich, of Germany.

EARLY PAPERMAKING IN THE FAR EAST.

A very interesting contribution to the history of paper manufacture has lately been made by Dr. Julius Wiesner, of the Academy of Sciences, at Vienna, to the Zentralblatt fur die Oesterr.-Ungar. Papierindustrie. During the past twenty years Dr. Wiesner has devoted considerable attention to the subject, and has demonstrated that the art of papermaking was practised since the 8th century by the Arabs, who—themselves instructed by the Chinese—communicated the process to Europe perhaps as early as the 11th century. The oldest specimens of paper hitherto discovered were sized with starch, which since about the 14th century has been replaced with animal size. Dr. Wiesner has studied not only the historical, but also the practical and technical side of the matter, having made careful microscopical investigations of several early samples of paper discovered in Egypt, etc. More recently he has been enabled to throw further light on the subject, owing to the discovery by Dr. A. Stein, in some ruins explored by him in Eastern Turkestan, of some very ancient documents on paper—four in number, now in the British Museum—which were referred to and illustrated in his books on the Sand Buried Ruins of Khotan, published in London in 1901 and 1903. Dr. Stein brought them under the notice of Prof. A. F. Hoernle, of Oxford, who in his turn submitted them to Dr. Wiesner for microscopical examination, sending with them some other specimens of known origin and date, for purposes of comparison. It was in two cases impossible to date the Stein documents with absolute certainty, but, generally speaking, the same characteristics were present in each, viz., a mixture of rag and vegetable fibres, sized with starch. Two of them were found among the ruins of Dandan-Uilig, in the desert of Taklamakan, northeast of Khotan (Chinese Turkestan), and the other two in the ruins of the adjacent temple of Endere. No. 1 was a Chinese document dated in A.D. 782; it was composed partly of vegetable fibres from Broussenatia Papyrifera and other plants, and rags. Of what the latter were composed Dr. Wiesner cannot say, but many woolen threads were discovered, with traces of starch adhering, though it did not appear that the paper was sized with starch or any other matter. Document No. 2 was also in Chinese, and dated in 784. It had been made from similar matter, there being no trace of cotton, but plenty of vegetable fibres and rags, which latter had evidently been macerated and mechanically treated, like those in document No. 1. There were traces of starch sizing, and also of pure starch not in the condition of size, so that Dr. Wiesner thinks there must have been a gradual growth of practice from using the starch in the ordinary pure state to making it into size. Wheat or barley starch was probably used. Document No. 3, a Thibetan MS., bore no date, but as an inscription found in the Temple of Endere (whence it came), recorded the fact that the building had been covered with sand as early as 719, it is assumed to be at least as old as that date, It was composed entirely of vegetable fibres, which had been subjected to a macerating process. They were probably derived from some species of Daphne such as Daphne cannabina or Daphne papyracea, the latter being used in Nepaul for papermaking purposes. As there was a considerable percentage of rice starch embedded in the substance of the paper, it was almost impossible to resist the conclusion that it had been added with the view of making some special variety. There was also a decided coating of starch on the written surface of the sheet, as well as traces of it on the back, possibly communicated by contact with the coated face of some other sheet. It was, in fact,

evident that the addition of starch to the paper alone enabled it to be used for writing purposes. Document No. 4 (of which only a tiny strip could be examined), was a Brahmin MS. in an unknown tongue; it was undated, but was possibly as old as the seventh century. It was composed almost entirely of vegetable fibres, which had been macerated. The sizing was a mixture of starch-size and free starch, with traces of gelatine derived from lichens. As the Chinese employed that plant as a basis for size in papermaking, the Doctor thinks that the document under notice was perhaps made from waste paper which had been sized in that way. In all four documents dicotyledonous plant fibres appeared to enter into the composition of the paper, a practice which was probably of Chinese origin. At some later date rag fibres were added, both sorts being beaten or pounded for use in papermaking, and also submitted to some macerating process. Although various plant fibres were used by the Chinese, the quality of the paper made was about the same, and the makers of it were probably the first to use starch for sizing purposes. In the earliest stage of papermaking in the Far East, the sheets turned out were of the consistence of blotting, and thus could only be written on by means of Indian ink. Then came a time when a better writing surface was obtained by facing the paper with a coating of, say, gypsum. The next stage was sizing with lichen gelatine, and then came the application of starch in the dry state, to which was subsequently added the use of diluted starch size. As soon as it was seen that the latter was an excellent sizing material, it was used to the exclusion of all others, and is found in most samples of early Chinese paper. The Arabs followed the latest practice of the Chinese in using starch-size without the addition of any granular starch. A knowledge of papermaking can thus only have been acquired by them at a time when the Chinese had passed all the preliminary experimental stages and arrived at the point of making ordinary size paper. Document No. 3 is supposed to have been manufactured in Thibet, and brought to Turkestan by the Thibetans, who conquered that district about 714. The Thibetan papermakers only seem to have used a single dicotyledonous plant in their work, i.e., Daphne cannabina or some closely allied variety, excluding rags altogether. The face of their paper was apparently only treated with starch for the purpose of rendering it fit to write on, whereas the Arabs and the Chinese used starch in paper to render it stronger, whiter, less permeable, and heavier. The notion hitherto entertained by those best entitled to speak on the subject, i.e., that the manufacture of rag paper was first practised by the Arabs, has been practically demolished by Dr. Wiesner's researches, which have demonstrated that rags were used in papermaking by the Chinese as early as the beginning of the eighth century. The Arabs, no doubt, brought this branch of the art to a state of perfection some three or four centuries later, and it was then communicated by them to the Europeans. But the Chinese were certainly first in the field in this direction, perhaps as early as the fourth or fifth century, or even earlier still, and their most ancient papers are distinguished from early Arab ones by the fact that the rags have been mechanically treated. Space has only permitted us to make for this journal a brief resumé of Dr. Wiesner's papers on this interesting subject, but they will be found in full in the pages of our Vienna contemporary. It may be mentioned that Dr. Wiesner had, prior to his receiving the Stein documents, made an examination of several other early papers, of Arab origin, dating from 751 to 796 (one was definitely dated 768), so that his previous researches placed him in a position to duly appreciate and recognize the special characteristics of early papers from the East. Nevertheless, the result of his investigation of the Stein documents has led him to change his preconceived ideas in some respects, and has also enabled him to carry back the history of the papermaking industry to a still more remote period than before, basing it, not on mere tradition, but on actual specimens of paper made.—World's Paper Trade Review.

EDGE-RUNNERS AND PULPING MACHINES.

The relative advantages and disadvantages of edge-runners compared with pulping machines, such as those of Wurster and Dietrich, are summed up by a writer in the Wochenblatt. For pulping waste paper where the expense of sorting is too great, and various foreign bodies, as pieces of string, thread and other hard or elastic impurities are present, edge-runners are indispensable. They further allow of the stuff being beaten wet or free to any desired extent, so that by varying conditions, such as quantity of charge, moisture and duration of treatment, any desired effect may be produced.

On account of this a better felting of fibres, and hence a tougher paper is obtained, which is better suited to retain coloring matter, mineral matter or other loading. The edge-runners are, further, the best and safest means for reducing such hard papers as parchment or strong glazed papers. It is a further advantage that wet beaten stuff can be obtained from such paper. Opinions are divided as to the advantage of a preliminary boiling, but the work of edge-runners the author considers to be effective without this.

On the other hand, with edge-runners a loss of time results in charging and emptying the pans; the period of treatment cannot be controlled, and a certain proportion of the fibres are damaged and ground so fine that they are lost. The process is a long one, and much power is frequently wasted yielding a product lacking in uniformity. Accidents to the workmen are not uncommon, and repair of the stones is expensive as it is not infrequent, and further loss results from the plant being kept at a standstill for a time. Any foreign bodies, such as wool or coal are ground up and contaminate the stuff, as also a certain proportion of sand from the stones.

With the pulping machinery the work is continuous and the yield large. There is a great saving in time and expense; product is of a uniform character; no damage is done to the fibres; there is no danger in working the plant; less space is occupied, and foreign bodies do not get ground in and mixed up with the pulp. On the other hand, unsorted waste papers are unsuitable, as they would clog up the machine, and certain hard, tough papers cannot be treated, but most important of all, wet stuff cannot be prepared with a pulping machine; resource must be had to the edge-runner.

Clayton Beadle is of opinion that, although the foregoing is true in many respects, there are many statements made which are certainly not borne out in the practice of this country. Thus, edge-runners are found to be not effective in hard-sized papers if the papers have not been previously boiled. It is next to impossible to grind up hard-sized papers that show lumps unless the stuff has been previously submitted to boiling. With papers containing rosin size the grinding can be effected the more easily in edge-runners, especially if a small amount of alkali is added during the grinding.

On the other hand, pulping machines are able to pulp up hard sized papers which have not been previously boiled, and to give a very excellent result. It can hardly be said that the period of treatment cannot be controlled with the edge-runners. The extent of the treatment is controlled by the time that the material is left in the runners, and by the amount of charge, etc., and the edge-runners need not be discharged until desired result is obtained, whereas, with a continuous machine, unless care is exercised, the stuff will come through before it has been properly pulped.

Accidents with edge-runners in this country are, Mr. Beadle thinks, very rare, and with a good pair of edge-runners with a granite bed and granite stones the wear is only slight, and the liability to injure the stones is very remote, but with most other remarks Mr. Beadle's opinion is in accord with that of the author.—Henry P. Stevens, in the Paper Trade Review.

FORESTRY EDUCATION.

The November number of the University of Toronto Monthly contains an article with the above title, written by E. J. Zavitz, B.A., superintendent of the forestry experimental plots at the Ontario Agricultural College in Guelph. The writer quotes Professor Fernow in defining a forester as follows:—

"A forester is not, as the American public has been prone to apply the word, one who knows the names of trees and flowers,—a botanist; nor even one who knows their life history,„—a dendrologist; nor one who, for the love of trees, proclaims the need of preserving them,—a propagandist; nor one who makes a business of planting parks or orchards,—an arboriculturist, fruit-grower, landscape gardener, or nurseryman; nor one who cuts down trees and converts them into lumber,—a wood-chopper or lumber-man; nor one sent to prevent fires or depredations in woodlands,—a forest guard; nor one who knows how to produce and reproduce wood crops,—a silviculturist; but, in the fullest sense of the term, a forester is a technically educated man, who, with the knowledge of the forest trees and their life history, and all that pertains to their growth and production, combines further knowledge which enables him to manage a forest property, so as to produce certain conditions resulting in the highest attainable revenue from the soil by wood crops."

Proceeding, Mr. Zavitz outlines the need of forest management in Ontario. We have forty million acres of non-agricultural land to be held as a forest reserve, besides a great number of small areas in the older parts of the province which have been cleared or burned over, and which might better be bearing wood crops than be lying idle or yielding agricultural crops at a loss.

The writer outlines what is being done in other countries in the way of forestry education—much of which information was also given in an article in this magazine in a recent issue—and closes with the following paragraph, which we heartily endorse:—

"In our own Province, considerable agitation in many quarters has shown that public opinion is demanding a more intelligent consideration of our forestry problems. Much can be learned from foreign methods, but it will be necessary for us to develop a system along lines which are peculiar to our own conditions. Technical training is as necessary for the proper treatment of forest lands as it is for the operation of mining or agricultural interests. A Forestry School in the Province of Ontario is evidently the next step towards the formation of a rational forestry policy. This step should not be difficult, as we have guidance in the experience of many older countries. The natural place for a Forestry School is in a state or provincial institution, such as the University of Toronto. Very valuable relations could be established between such a school and the Crown Lands Department, which has the administration of our forest reserves. As the Ontario Agricultural College is in affiliation with the provincial University at Toronto, such a school could be of great benefit to any agricultural forestry movement."

COLORIMETRIC TEST FOR CELLULOSE.

Cellulose may be assumed to be composed of those carbohydrates which, when heated for twenty-four hours at a temperature of 108° C. with a solution of calcium or magnesium bisulphite of a certain strength do not pass into solution. By this treatment other carbohydrates similar to cellulose are dissolved, such being, e.g., hydrocellulose, oxycellulose, and pentosanes. Pure cellulose yields perfectly clear solutions with concentrated sulphuric acid, and such solutions only become colored very gradually. In many celluloses, such as those from birch and beechwood, 0.2 to 0.3 per cent. more carbon is found than

is required by the formula $C_6 H_{10} O_5$.

Cellulose is most probably not a single chemical compound, but a mixture of compounds containing also hexose and pentose groups. To enable impure cellulose to be accurately weighed, the sample should be dried in a desiccator over phosphorus pentoxide, at a temperature of 60° C. Muller's process of alternate treatment with bromine water and ammonia is preferable to Schultze's method for the determination of the cellulose in wood fibre. To obtain pure cellulose, however, Muller's method of treatment must be continued for eight days, but the cellulose becomes attacked by the bromine. In such case a correction of about 3 per cent. should be made. The methods at present in use for the accurate determination of cellulose are so complicated and consume so much time that a colorimetric method for the rapid determination of cellulose is preferable.

By this method the purity of a cellulose is determined by the brown color yielded by the treatment of a certain amount of cellulose with a certain amount of concentrated sulphuric acid. The more intense the brown color produced the more impure the cellulose so treated. The method may be carried out as follows: 22 milligrammes of the sample (corresponding to 22 milligrammes of absolutely dry fibre) are dissolved in 20 c.c. of concentrated sulphuric acid. Comparative colors are obtained by dissolving other kinds of fibre in the same way, the cellulose in which has been determined by one of the accurate but more complicated methods above mentioned.

The solution of the sample under examination is diluted with alcohol until of the same color as the pattern containing a particular amount of cellulose. From the ratio of the volume thus obtained the percentage of cellulose or impurities, etc., can then be calculated. The results are accurate to within 0.1 per cent.—Professor P. Klason, in Papier Zeitung.

THE BLEACHING OF WOOD PULP.

By R. W. Sindall, F.C.S., and F. Heckford, in World's Paper Trade Review.

(Continued from last issue.)

The facts recorded in the previous article as to the behavior of wood pulp when brought into contact with solutions of ordinary bleaching powder indicate that considerable variations in the final results are possible. At the same time the papermaker is, generally speaking, only concerned with the problem of getting a certain desired result in a minimum of time with the least amount of expenditure.

Unfortunately there is a great tendency on the part of most practical men to regard this problem as a merely mechanical process, and that it may be solved by haphazard alterations of existing methods. Now while it is true that some of the modern systems have displaced older methods with advantage, probably as a result of a lucky hit, yet we cannot look upon any such procedure with satisfaction if all the intricate paper mill problems are to be dealt with similarly.

In the case of wood pulp, it is well known that improvements have been made with the operation of bleaching to such an extent that any further progress seems out of the question, but our knowledge of the reactions taking place is after all extremely limited, and so long as this limitation exists, the work of bleaching cannot be put on a satisfactory basis.

In proportion as we investigate the conditions under which the bleaching takes place, we accumulate facts and data upon which to devise methods of treatment calculated to give definite results. It is obvious that a papermaker would be amply repaid for the costs of such an investigation, but so long as the technical chemist attached to many mills is merely regarded as an official for testing moisture in pulp, bleach, soda, ash in papers, and so forth, all of which details are important enough, then so long will the higher and more valuable branches of scientific papermaking remain untouched.

These remarks may appear to be a digression from the main subject under con-

sideration, but as a matter of fact they have an important bearing on such a technical matter as the bleaching of pulp.

The rate at which the bleach used for pulp is consumed when a known weight of the latter is mixed with a measured volume of solution, must throw some light on the question. The precise relations between the chemical constitution of wood pulp and the rate of consumption have not been studied, and therefore it is scarcely possible to say at the moment what practical results would accrue to the papermaker.

Pulps vary a great deal in their behavior. Two brands may bleach to an equal color in the same time, and show considerable differences in color during successive periods. Some pulps bleach slowly at first, and more rapidly in the later stages, while others behave in quite the opposite manner.

The methods for determining the rate of consumption of bleach are very simple, and in order to assist our younger readers to working out problems for themselves, we append a few directions.

(1) Solutions Necessary. — Standard solution of arsenious acid, and a freshly prepared bleach liquor of convenient strength. For investigation of a prolonged character it is very convenient to make up the bleach so that its strength is

1,000 cc. bleach liquor = 50 grammes of strong powder.

Since 1 cc. normal arsenious acid = .00355 grammes chlorine, we may also assume that for good bleaching powder of 35 to 36 per cent. chlorine, 1 cc. normal arsenious acid = .01 grammes of good bleaching powder (having an average strength of 35.5 per cent. available chlorine).

If the powder used for the preparation of the solution is weak, corrections must be made accordingly.

Example.—If powder tests 35.5 per cent. available chlorine weigh out 50 grammes for 1,000 cc. solution. If powder tests only 33 per cent. available chlorine weigh out 53.03 grammes for 1,000 cc. solution.

By this means the relative strengths of the arsenious acid and bleach solution are constant, so that

5 cc. normal arsenious acid = 1 cc. strong bleach solution.

A convenient quantity of the air dry wood pulp, say 5 grammes, carefully selected so as to form an average sample of the sheets taken, is thoroughly broken up by being moistened with hot water and then torn in small shreds. The pulp is placed in a dish with a measured quantity of water, and the volume of bleach added in requisite proportions. For a pulp likely to consume a large amount of bleach, add such a volume of solution as will contain dry powder equivalent to 25 per cent. of the weight of wood.

The following proportions have been found to work well for an investigation of this character:

Air dry wood pulp, 5 grammes.
Solution of bleach, 25 cc. (equal to 1.25 grammes powder.)
Water, 55 cc.

Ratio of wood pulp to solution, 1:16.

From time to time, at intervals of one hour, more or less, according to circumstances, small definite quantities of 2 cc. are withdrawn and titrated with normal arsenic and the consumption of bleach noted.

Example.—2 cc. of the solution made according to the instruction given (viz., 25 cc. strong bleach and 55 cc. water), will require 13.12 cc. normal arsenious acid for neutralization.

If after one hour, 2 cc. withdrawn requires 2.5 cc. normal arsenious acid, the conditions are:

2 cc. solution = 2.5 normal arsenious acid.
2 cc. solution = 0.5 cc. strong bleach solution.

Hence, 80 cc. solution = 20 cc. strong bleach solution which represents the bleach unconsumed at the end of the first hour. In calculating the bleach unconsumed at the end of the successive hours, corrections must be applied for the quantities withdrawn for titration.

In order that experiments on the amount of bleach consumed by one ton of a certain pulp shall give consistent and uniform results, it is necessary to exercise some care in the selection of samples. This

refers more particularly to laboratory trials on consignments delivered for mill use. When we consider that four or five grammes of pulp (453 grammes = 1 lb. avoirdupois), have to be taken as representative of a delivery of say 50 tons air-dry pulp, it is obvious that careful discrimination must be exercised in drawing sheets for ultimate analysis.

The Selection of Samples.

The process known as "quartering," so common in the operation of sampling ores, may be adopted in principle; at least, with great advantage. In its application to the method of sampling pulp we proceed as follows:

If the parcel of 50 tons consists of 400 bales, take 16 or 20 bales equivalent to 4 or 5 per cent. of the total number from various sections of the stack. Where possible, it is far better to take every twentieth bale from the consignment as it is being delivered into the mill. Out of each bale draw a sheet, preferably from the centre. Cut each sheet into four parts. Reject three of the quarter sheets and keep the 20 quarter sheets for analysis.

The laboratory sample thus obtained gives an ample supply for several duplicate tests, and also sufficient pulp to be kept as a reserve for reference.

The small quantity necessary for bleaching, viz., four to five grammes, can be obtained by cutting out small discs with an ordinary cork borer, two or three discs being taken from each sheet. Or strips one-quarter inch wide can be cut from all the laboratory sheets, and divided into suitable lengths.

This method is simple, and ensures accurate results.

The Rate at which Bleach is Consumed.

We have suggested that the rate of bleach consumption might be studied with advantage as probably affording some data for the investigation of the nature of the constituents of wood pulp. We now give the results of some preliminary trials in this direction.

Experiment I.—Brand C.—An ordinary soda wood pulp. 50 grammes air-dry pulp with 450 cc. bleach liquor at 65 degs. F. (containing bleach solution equivalent to 11.7 grammes of dry bleaching powder).

Experiment II.—Brand B.—A sulphite pulp. About 14 per cent. of bleaching powder, calculated on the air-dry weight of pulp, added. Actual consumption for color required amounted to 12.5 per cent.

Experiment III.—Brand A.—A sulphite wood of good color, requiring a consumption of 8 per cent. of bleach.

Setting out in tabular form the rate at which the amount of dry bleaching powder is consumed, we obtain the following results, expressed in terms of the percentage rate. The total bleach added is taken as 100 and the proportions consumed each hour are taken as percentages of the total:

RATE OF CONSUMPTION.

Hours.	Brand C.	Brand B.	Brand A.
0	.0	.0	.0
1	33.0	..	20.0
2	44.0	30.0	33.0
3	51.0	..	43.0
4	66.0	55.0	49.0
5	70.0	..	56.0
6	..	78.0	63
7	80.0	90.0	70

It will be noticed that in none of these cases was the total bleach consumed in the seven hours. If the figures are plotted out on a curve, the differences in behavior become very clear and may be expressed in definite form.

Thus with Brand C., we have a pulp which bleaches very rapidly during the first hour, and then bleaches at a uniform rate for the succeeding four hours, and subsequently consumes bleach very slowly.

In the case of Brand B., the pulp bleaches somewhat rapidly during the first hour, and then the rate of consumption is quite uniform for the following six hours.

Finally with Brand A., the pulp, in common with most brands, consumes bleach rapidly at first, but afterwards the rate of consumption gets slower and slower.

These three brands are typical of the conditions which will occur with the majority of pulps. The rate of consumption beyond the period of seven hours is not of immediate interest to the papermaker, but it is still a question of some moment in an investigation of this kind. The period for absolute and final disappear-

ance of the total bleach added was not determined in these preliminary trials.

(To be continued)

REMINISCENCE OF THE DON PAPER MILLS.

V. H. Hickox, of Niagara Falls, gives to a contemporary some recollections of the Don Valley Paper Mills. Although Mr. Hickox is mistaken in stating that this was the first paper mill in Upper Canada, his letter is an interesting contribution to the history of paper manufacturing in Canada:

"It was the summer of 1841 that my father and another paper maker, whose name was Samuel Prine, engaged to go to Toronto and start the first paper mill in Upper Canada. They left Niagara Falls in June of that year. This mill was located about three miles from the city, up the River Don, a beautiful, clear stream of water, well supplied with trout and other kinds of fish in abundance. The country round about was a vast wilderness of heavy timber, mostly pine, with here and there a little clearing with log cabin homes of the early pioneers. Eastwood & Skinner, brothers-in-law, two enterprising Englishmen, built the first mill and received a cash premium from the Canadian Government. In connection with the paper mill there was a grist mill, a brewery and distillery, owned by the Helliwell Bros., and the place was named Don Mills. Owing to the ruggedness and beauty of scenery and the genial and fraternal spirit of the inhabitants, my father and Prine became attached to this new neighborhood and resolved to move from Niagara Falls that summer. I was five years old, and a sister three, when my father migrated to Don Mills. Mr. Prine had three little boys. We soon formed an acquaintance with other children in that locality in the old red school-house on the hill. Charley Medford, George Cudmore, Tom Thorn, Dave Cramp, they were the favorites. Mr. Prine, after a stay in Don Mills of three years, got homesick, and, to please his wife, moved back to Niagara Falls, in 1844, and soon after died on Bath Island. My father made a sojourn of seven years during which time he started a second paper mill on the Don river, two miles above the first mill. We moved to Hamburg, west of Buffalo, about 1848. In the year 1851 Albert H. Porter sold the paper mill on Bath Island, and my father, by this change, secured his old position as superintendent of the upper Don paper mills. Then he moved back to Toronto in 1851, where he remained for many years, respected as the man who made the first sheet of paper in the Upper Province of Canada. The wilderness of the Don has changed like other localities. The old paper mills are no more. Others of later date have taken their places. I strode down the old hill road into the valley where I oft coasted with play-mates. At the foot of this hill road is where the first paper mill stood. Now a brick structure has taken its place. The old Eastwood home, a stone house, still remains. The Skinner house, that stood near by, known as the old red house, built of wood, has disappeared, nothing but the foundation remains, overgrown with weeds and wild grass. Where the grist mill and brewery of the Helliwell Brothers stood and a large dwelling house, nothing but ruins remain."

—Karl Gaertner, of Berlin, has invented a process for turning to account the sticky wastes arising from the manufacture of paper and cellulose, which have hitherto been only incumbrances to manufacturers. Gaertner works the waste up into a plastic mass and makes friezes, wall ornaments, etc. His method is to cover the object (or form) from which a cast is required with a tolerably wide-meshed tissue, and then paint the paste on the latter, which also serves to suck up the moisture of the mass, so that within a few minutes the cast can be rolled off. The "Plastoid-Industrie" in Munich, has put some "taking" samples on the market.

Twelve improved diaphragm screens are being installed in the pulp mill at Sault Ste. Marie, Ont., replacing those that have been in use for some time.

Forestry and Pulpwood

On the 1st inst., word was received at St. John's, Nfld., by cable, that the directors of the Amalgamated Press, Limited, had accepted the terms of the purchase of timber lands, recently arranged by Sir Alfred Harmsworth. The price to be paid is $500,000, and it is stated that the Harmsworths will spend $2,000,000 in erecting pulp mills.

W. H. Parsons, of New York, who has owned the controlling interest in five companies—the W. H. Parsons Company of New York, the Bowdoin Paper Company of Brunswick, Me., the Lisbon Falls Paper Company of Lisbon Falls, Me., the Pejepscott Paper Company of Brunswick, Me., and the Bay Shore Lumber Company—has just sold his interest in the same to David S. Cowles of New York, and the Hon. F. C. Whitehouse of Topsham. Mr. Whitehouse for many years has been the head of the Bowdoin Paper Company. Mr. Parsons' retirement further consolidates the important paper interests which have extensive timber land holdings in New Brunswick. The formation of the Bay Shore Lumber Co., and their acquisition of timber lands at Great Salmon River, N.B., was noted in this column last month.

The Upper Spanish Improvement Co. has been incorporated under an Ontario charter, with a capital of $20,000, to construct dams, slides, piers, etc., on the Spanish River at and above Biscotasing Lake. The headquarters of the company will be at Biscotasing, and the provisional directors will be Robert Booth and Patrick Shannon, of Pembroke, and John A. Shannon, of Biscotasing, all lumbermen.

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PERSONAL.

Harry Smith was caught in a shaft in the Montrose paper mill, St. Catharines, Ont., Canada, last month, and was almost instantly killed. He was forty-one years of age, and is survived by a widow and seven children.

F. Howard Wilson, president of the J. C Wilson Co., Limited, was presented by the employees of the Montreal, Lachute, St. Jerome, and Winnipeg branches of the firm with a grandfather's clock on the occasion of his marriage.

It is stated that John R. Barber, M.P.P., will retire from political life. He has been member for Halton for six years, and though never prominent as a politician, he has done good committee work and has been an able supporter of the Government.

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CATALOGUES, BOOKLETS, ETC.

The Canadian Oliver Typewriter Co. has issued a leaflet reporting the results of the awards at the World's Fair, St. Louis. The Oliver machine took the gold medal. Each of the many exhibitors urged a score of claims why they should get honors, and there was so much fighting for the chief prize that the jury must have had a hard time of it. It is very gratifying to know that the grand prize was carried off by a machine which was invented by a Canadian and developed in Canada.

The Kinleith Paper Co., of St. Catharines, for whom C. Howard Smith, 4 Cote St., Montreal, and 84 Wellington St. W., Toronto, is selling agent, advise their customers that having got settled in their new quarters, after the Toronto fire, they will resume the issue of their samples of special papers.

The B. D. Rising Paper Co., of Housatonic, Mass., are sending out a series of special makes of bond papers for which high claims are made. The Buntin-Reid Co., Toronto, are Canadian agents for one class of these papers, the Barber & Ellis Co., Toronto, for another, and Davis & Henderson, Toronto, for a third.

The B. Greening Wire Co., of Hamilton, Ont., are publishing in January a series of catalogues, one for each separate department. The first deals with wire cloth and perforated metal. They have spent a great deal of labor on this book, and it is the most complete catalogue in these two lines of business we have yet seen. It is not only complete, but convenient in form. The mesh in wire cloth is measured from the centre to centre of wire and this fre-

quently leads to confusion owing to customers and others measuring between the wires, so the Greening Wire Co. publish a half-tone with rule on it (page 21), showing how cloth should be measured, and on page 10, a half-tone showing how screening is measured. One is from centre to centre of wire, and the other in the clear or between the wires. They also show through the catalogue a great many cuts showing the full size of the screening and wire cloth, but the most important improvement this year is giving the decimal size of the opening as well as the decimal size of the wire, thus enabling anyone at a glance to see what to order should he have been using a wire cloth and want to replace it with something heavier or lighter, which would give exactly the same size of opening. In perforated metals they give illustrations of the exact size of the dies, besides the trade number and measurement of the holes. The general appearance in regard to the paper, printing, etc., is highly creditable. A cut shows the latest additions to the company's works. Pulp manufacturers will be specially attracted to page 47, where pulp mats are described, although every pulp maker will be interested in the balance of the catalogue. The company will be pleased to forward copies of these catalogues to any readers interested.

SCREENING PULP.

Among patents recently issued in Great Britain is one to Theodor Qviller, residing at Essvik, near Sundsvall, Sweden, and Hans Stub, residing at Christiania, Norway, for improvements in centrifugal machines for screening pulp and paper stock. In their specifications, the inventors say: "Our invention relates to centrifugal machines for screening pulp and paper stock, and especially to that type of such machines in which the stock is thrown against a circular pulp-screen by means of a wheel provided with wings mounted inside the screen and rotating with a high speed, whereby the fine stock will by the centrifugal action be pressed through the screen and gathered on the other side, while the coarse fibres or slivers are withheld by the screen and conveyed away for further treatment.

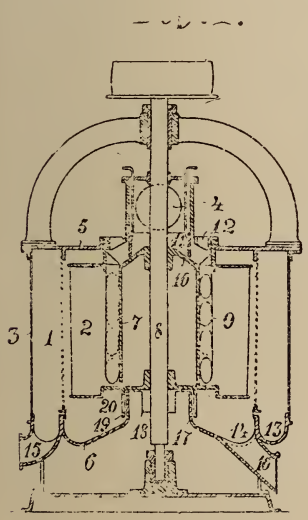
"The object of our invention is to improve this type of centrifugal screening-machines, first, so that their efficiency shall be increased; secondly, so that as little as possible of the fine stock shall be carried away with the coarse fibres, and so that the coarse fibres shall be obtained in as dry state as possible. With these ends in view, our invention consists in means for spreading the stock in a thin and uniform layer on the wings, whereby it will hit the screen in broad streams of uniform thickness. It also consists in means whereby the thickness of these streams may be easily regulated at will, according to the nature of the stock and other circumstances. It further consists in means for providing a certain vibration of the air surrounding the screen for the purpose of facilitating the passage through the screen of the fine particles and the dropping down of the coarse particles."

In the drawings, Fig. 1 shows a vertical axial section through one form of the improved centrifugal pulp-screen. Fig. 2 is a horizontal section, and Fig. 3 is a detail, being a developed cylindrical section through part of the distributing-channels. Fig. 4 is a vertical axial section through another embodiment of the invention.

Referring more particularly to Figs. 1, 2 and 3, 1 represents the circular screen, which is mounted in a suitable way between the base-casting 6 and the top casting 5 of the machine; 3 is the outer shell of the machine, being also fixed in suitable way between the two castings; 2 represents the wings of the centrifugal wheel 7, which is keyed or otherwise secured to the axle 8. The upper hub of the wheel is united with the wheel 7 itself by a conical part 10, between which and the top casting there is in this manner formed a passage for the stock, which enters the machine through a pipe connected to the opening 4, and passes down over the cone 10, in the form of a conical disc-shaped stream, the thickness of which may be regulated by way of a ring-gate 11, which may be moved vertically by means of

rods, as indicated, or in any other suitable way.

From the foot of the cone 10, channels or tubes 9, are led in an inclined position, as clearly shown in Fig. 3. There are a number of such channels in each space between the wings close to the outer side of the wheel cylinder 7, and they have their lower openings in a short distance from a wing. The stock will, therefore, be distributed over the wing in its whole height. These channels may be tubes, as shown, or may be cast in the wheel. They need not be closed on the inward side, because the centrifugal force will press the stock outwardly. 12 represents openings in the top of the machine through which a clearing out of the channels may be effected by means of a water-jet during the working



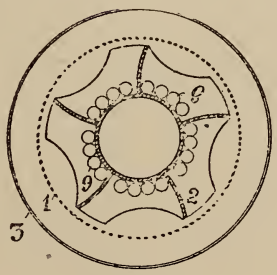


Fig. 3.

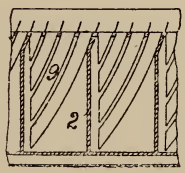
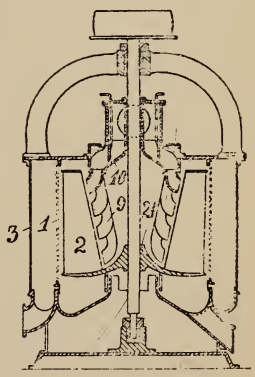


Fig. 4.



of the machine and by means of stakes when the machine is at rest. The fine stock is gathered in a circular trough 13, from which it is carried away through a chute 15. The coarse fibres are gathered in the trough 14, and are conveyed from here through the chute 16.

The inventors find it advantageous to allow air to enter the machine and to do this in such way that a vibratory air-current presses on the screen 1. This may be effected by providing in a flange 17, which projects from the bottom casting 6 of the machine to close underneath the centrifugal wheel openings 18, and providing similar openings 20 in a flange 19, projecting downwardly from the wheel. When the wheel revolves, these openings will intermittently correspond with each other and be covered by the flanges, whereby the vibrations in the air will be created. The wings 2 will, by their suction, cause air to enter through the said openings, and, if necessary, special wings for this purpose may be arranged on the lower side of the wheel. This vibratory air-stream will act to loosen the fibres accumulating in the perforations of the screen and also according to their experience, involves a less percentage of water in the coarse stock gathered in the trough 14.

In the modification shown in Fig. 4, the wings 2 are carried by only one hub 21, and the distributing-tubes 9 do not, therefore, rotate with the wheel, but are stationary, the cone 10 being mounted on the top casting of the machine. In this case the lower openings of the tubes have to be directed outwardly, as shown. The machine may in other respects be like the first-described modification.

The inventors assert that by their machine they are able to distribute the stock over the whole height of the screen in a uniform layer as by regulating the valve 11 the amount of stock passing to each channel will be exactly regulated. In

other known apparatus a regulating of the flow of stock into the centrifuge will only or chiefly have the result that more or less of the screen-surface will be utilized, and a regulation of the thickness of the layer is therefore hardly possible by these apparatus.

PAPER MARKET OF JAPAN.

Previous to the outbreak of the war between Japan and Russia, there was plenty of foreign paper on the Japanese markets, but, owing to the increased number of papers and periodicals relating to the war that have since been issued, the demand has increased over 20 per cent. A large number of the leading papers have also been issuing supplements, and though these are chiefly printed on small slips of paper they have done much to increase the demand. As the war continues, it is expected that the amount of foreign paper used in Japan will materially increase.

Before the war broke out all the superior quality paper was imported, but, as is usual in case of war, owing to the want of ships and the higher rates of insurance, there has been a decrease in the imports and this has resulted in the price being raised more than usual. Nearly all the better quality paper used to be imported from Germany and Australia, the Japanese themselves chiefly manufacturing paper of coarse quality, for which there is a very great demand in the "Island Empire of the East." However, the general tendency in Japan is to use better papers for newspapers and periodicals generally, and the Japanese are preparing themselves to meet the new demands of the market. During the year 1903 £306,422 worth of European paper was imported into the island, as against £366,440 in 1902.

The chief aim of the Japanese, nevertheless, is to manufacture paper for China. For over ten years they have been working to this end, and there does not appear to be any doubt that when this object is accomplished it will do much to promote the cause of the country among the Chinese. About ten years ago the Fuji Paper Mills (one of the most important paper-making concerns in Japan), used to export about 15,000 yen (or £1,500) worth of paper to China per month, but the war with China completely suspended the trade between the two countries. After the war the Japanese made every possible effort to restore happy business relations, and when success was well in sight the Boxer outbreak in Northern China again checked the trade. And then again, when another attempt to regain the business had nearly reached maturity, the present war broke out. Although this has undoubtedly injured the business, it has not done so to anything like as great an extent as was at first feared. In fact, just before war was declared, it was anticipated that the entire trade would have to be suspended, but fortunately, this is not so, and much of the business is now proceeding as usual —the Japanese victories at Chemulpo and Port Arthur having reduced Russia's naval strength so much that the Japanese merchantmen can ply in the China Sea with practically no danger.

China, itself, however, is not entirely without the means of manufacturing paper, but as the enterprise is confined to Southern China (especially Fukien and the neighboring provinces), it is in many cases cheaper to import direct from Kobe and Osaka.

The Chinese use a kind of bamboo as material for their paper, and this tends to increase its value. The paper that the Japanese export to China differs from that used in England and America; it is known as "toshi," and is used by the Chinese in large quantities. H. Kawase (director of the Fuji Paper Mill, and a well known authority on this subject) expresses his opinion in the Tokio Sun Trade Journal, or Taiyo, that there will be "a grand opening for this kind of paper in China, and when the war ends in our complete victory, and the credit of Japan is raised in the eyes of China, there will be a splendid market for Japanese paper."—Stanley Roe in "Paper Making."

PULP AND PAPER MARKETS.

Drouth and consequent lack of power is the cry in nearly all parts of the country at present. On the Ottawa, the lack of power has curtailed the running of some of the mills, while the drouth is also seriously affecting the wood supply. Attempts have been made to get out pulpwood hung up last summer, but these have been stopped by a sudden freeze. In Vermont the drouth is so serious that farmers have to draw water as far as three miles. The Milton, Vt., mill of the International Paper Co. was recently reported as seriously handicapped, and unless rain came, it was expected that a great many plants would be tied up. It is admitted by New York papers that there is drouth from Maine to Wisconsin. In the past few days ground wood took a jump of $4 a ton, and mills are holding stock wherever possible for very much higher prices. If a fair demand comes for news print, it would not be surprising to see ground wood go up to $30, delivered at the American mill. At present there is no price for ground wood. One Ontario mill is paying $10.40 for peeled spruce from Quebec.

The present supplies of wood are rather short, and the mills will be in need of wood which will have to be brought in by rail at an increased cost of $2 or $3 a cord. The present cut in the woods and the wood left on the banks of the streams will not relieve the situation until the middle of April or first of May.

The demand for sulphite is good, and prices have risen $3, but mills are not anxious to sell. One or two makers have expressed themselves to the effect that pulp will go at least $5 higher than it is now.

In Scandinavia the drouth still continues, and winter is apparently setting in without rain. Sulphite prices have increased about $7 a ton over last summer's price, this being in sympathy with the price of ground wood.

The Canadian Paper Makers' Association met recently in Ottawa and decided not to increase the price of paper, on account of new mills opening up and seeking a

market. This decision applies to news print and wrappings. Book papers and writings should have an immediate advance on account of the high price of both foreign and domestic linen and rags, also sulphite and soda pulps, all of whch have sharply advanced.

The New York market is reported thus: The market for ground wood is very firm. Supplies are scarce. Both foreign and domestic sulphite fibres are strong, but the volume of business doing has fallen off. We quote: Domestic bleached sulphite, 2.50 to 3¼c.; unbleached, 1.85 to 2.10c.; foreign bleached sulphite, 3⅛ to 3⅜c. (delivered, New York and Boston); unbleached, 2.15 to 2.25c.; domestic soda fibre, 2¼ to 2.35c.

Latest reports from London quote bleached sulphite, £12 to £12 10s.; unbleached, first quality, £9 5s. to £9 15s.; soda, first quality, £9 to £9 10s.; mechanical, 50 per cent. moist, £2 10s.; dry, £5.

—The World's Paper Trade Review in reporting the recent dinner of the British Wood Pulp Association, makes one speaker use the expression, the "Dominion of British Columbia," while another speaks of "that western province, the Dominion of Canada." Is Canada a province of British Columbia, or is British Columbia a country distinct from Canada as some Unitd States papers would have us think?

PAPER STOCK MARKET.

Paper Stock.—There has been a gradually increasing scarcity of all kinds of waste material for paper stock, with the exception of old bagging, of which there are full stocks, but for which there is little or no enquiry. Blues and thirds are scarce and have advanced $3 to $4 per ton since our last quotation. New cuttings are all higher, and the best lines are being bought up by American mills. There is a good demand for waste paper, but no serious advance in price. Stocks are being shipped as soon as picked, and there are no accumulations to meet any increased demand. Manilla rope is a little firmer, the avail-

able stock here at present is very small.

Quotations are as follows:

White shirt cuttings	$0 05	to	$0 05½
Light print cuttings.....	3½	to	4
Unbleached cuttings	3¾	to	4¼
Corset cuttings	4	to	4½
White shoe rags	4	to	4½
Colored shoe rags	2¾	to	3¼
Blues and thirds	1.30	to	1.45
Roofing stock	50	to	60
White paper shavings....	1.00	to	1.50
Mixed colored shavings.	60	to	75
Common waste paper ..	40	to	50
Manilla rope	2	to	2¼
Old bagging	45	to	55

—R. W. Sindall, pulp and paper chemist, commenting on a note in Pulp and Paper, London, on testing paper for ground wood, says: "My own experience is that users of paper rely too much upon the phloroglucine testing. The mere fact that lignified fibres give this red coloration must not be overlooked in testing papers for ground work. In some cases an injustice may be done to the papermaker. Curiously enough I have had cases brought under my notice in connection with lectures which I am giving in London. In one case the phloroglucine test did not give a general red color to the

paper, but at the same time a few small fibres here and there were colored red, but these fibres were so scattered over the sheet that they did not give the sheet, as a whole, a red coloration. The paper on being examined in the microscope showed traces, and only traces, of mechanical wood. In another case a super-calendered printing paper, guaranteed to be free from mechanical wood, gave a red coloration, with phloroglucine. This paper proved to be free of ground wood but consisted of a hard sulphite pulp. It is well known that a hard boiled sulphite pulp gives a strong red color with this reagent."